The Builder.

VOL. LXXXV.—No. 3136. AUGUST 1, 1903

ILLUSTRATIONS.

Sculpture: "Harmonies" ..... By M. Raphael C. Peyre.
Sketches in Worcestershire ..... With the Architectural Association.
House at Shepherd's Green, Chislehurst ..... Messrs. W. Curtis Green and A. C. Dickie, Architects.
House at Great Shelford, near Cambridge ..... " " "

Blocks in Text.

Mediæval Porch, St. Sophia ..... Page 124
The Architectural Association Annual Excursion:—
Grafton Manor House, Pigeon House, and Chapel. From the Water " 129
Tiles in Bredon Church ..... " 130
Bench End in Bredon Church ..... " 130
Bredon Church, S.W. ..... " 130
Bredon Church: Ground Plan ..... " 130
The Architectural Association Annual Excursion (continued):—
Bredon: The Barn ..... Page 132
Middle Littleton ..... " 132
Tithe Barn, Littleton ..... " 131
Evesham: The Bell Tower ..... " 132
Evesham: Entrance to the Abbey ..... " 132
Evesham: "Lantern" in the Almonry ..... " 132
Illustrations to Student's Column 140

CONTENTS.

Notes in Constantinople 123
A Book of Country Houses 124
Notes 125
Letter from Paris 127
The Architectural Association Annual Excursion 129
The Royal Archæological Institute at York 132
The Architectural Association Summer Visits 133
British Association of Waterworks Engineers 133
Illustrations:—
Sculpture: "Harmonies" 136
Sketches in Worcestershire 136
House at Shepherd's Green, Chislehurst 136
House at Great Shelford, near Cambridge 136
The London County Council 134
Institute of Sanitary Engineers 136
Competitions 137
Applications under the 1894 Building Act 137
Court of Common Council 137
Metropolitan Asylums Board 138
House Building in Frosty Weather 138
National Federation of Building Trade Employers 138
Correspondence:—
Sewage Disposal 139
The Student's Column 139
Books Received 140
General Building News 140
Miscellaneous 142
Legal:—
Nuisance Case in Sloane-street, W. 143
Action on a Covenant 143
Tarpaulin Shelters on Scaffolds 143
Point under the London Building Act, 1894 143
Point under the Metropolis Local Spaces Act 144
Patents of the Week 144
Meetings 145
Recent Sales of Property 145
Prices Current of Materials 146
Tenders 147
Competitions, Contracts, and Public Appointments 148

Notes in Constantinople.

IN a way, few places are more disappointing to the expectations of the average educated visitor than Constantinople, as the famous city becomes visible from the ever-calm lake-like waters of the Sea of Marmora. Its beauties as a maritime city may perhaps have appeared more evident in former ages; at the present day the mouth of the Bosphorus is usually wreathed over with clouds of smoke from the innumerable steamers which fill the harbour and the Golden Horn—strange misnomer for a particularly leaden-looking sheet of filthy water—and from the factory chimneys of the squalid industrial quarters.

A near approach to Constantinople completely dispels any illusions which may have been derived from reading old-world books describing the splendid capital of the Eastern Empire and of the Caliphs. Turkish towns all resemble each other in a remarkable degree, and the principal capital of the Mohammedan world is very little more imposing or superior in style to half a hundred provincial centres. The same narrow, dirty unpaved streets lined with roughly built houses of not the smallest architectural pretensions meet the eye everywhere. Here and there, relieving the all prevailing modern ugliness, a mosque with its numerous domes and semi-domes rises in huge wen-like growth from amongst the crowded tenements of humanity; but there is nothing beautiful in the exterior of a Turkish mosque, and very little that is even attractive in its usual accompaniments of fountains or garden gateways.

Constantinople in its Turkish aspect belongs to a period when the Renaissance of Europe was spreading eastwards and the misunderstood details of architecture and ornament belonging to Western civilisation were being adopted (often with most remarkable results) by the Levantine races. At the same time such details could only be used in a very restricted sense in consequence of religious prejudices, and such restrictions eliminated the great mainspring of all true art—the study of the human figure. So-called Turkish art is probably one of the poorest varieties in the world. It lacks the inventiveness and ingenuity of its nearest racial relative, the Chinese style, whilst it has none of the colour-sense and constructive ability of the Arab and Persian. To the student of art Turkish Constantinople presents little, if anything, for study, and its clumsy stone carvings, intended as imitations of French or Italian art of the past three centuries, are merely grotesquely absurd when not actually repulsive. Even mere floral and leafage decorations are so badly executed that the best of Turkish designs would be bad anywhere else. This kind of design in architecture (*i.e.*, constructed ornament) and decoration is, in fact, more of an object-lesson in what to avoid as utterly wrong in principle than of anything to be admired. In it the architectural forms adopted have no reference to the construction, and almost every detail is misplaced.

On visiting Constantinople the student of historic monuments must be impressed by one very remarkable fact. The city has always been one of the most important, if not of the wealthiest in the world, and yet few great centres of population have so very few vestiges of antique greatness about them. With the exception of St. Sophia, the monumental remains of the long period intervening between the days of Constantine the Great and Constantine XIII., a period of eleven and a half centuries, are hardly represented by any surviving work of art. The two or three fragments of prehistoric or monolithic character still standing erect in the Hippodrome and elsewhere have no local connexion with the city, being mere loot from Egypt or Greece.

The question presents itself: What can have become of all the monuments of Classic or Mediæval times which must once have existed to allow of the city's designation as New Rome? Such a complete clearance of an ancient site, even by so alien a race as the Turkish is very rare—indeed unique.

The innumerable sieges to which the city was subjected during the Middle Ages would account for a very great destruction of the ancient Roman remains, but the final siege and occupation by the Turks is of a period so comparatively recent that the disappearance of mediæval Constantinople becomes exceedingly remarkable. Perhaps the patient investigation of the enormous blocks of half-ruinous building which constitute the palaces of Pashas and officials in the older portion of the city, by some resident student, would reveal the existence of mediæval fragments; such an investigation would, however, require considerable time and enthusiasm. To the superficial observer there is nothing to be seen which would encourage such labours; the uniform pall of an uninteresting drab-coloured plaster covers everything, its frayed and broken edges affording a glimpse of a particularly mean and deplorable construction in wood and bad stone or brickwork underneath.

Constantinople is, and always has been, proverbial for its fires. Conflagrations at times sweep whole districts away many times over within the same area, and within comparatively short periods. Mounds of immense height now cover the mediæval city in all directions, and probably beneath them are buried the remains of the period before the Turks. Even around St. Sophia, where there has always been probably a certain amount of open space preserved, the earth has risen to a height of many feet, and this would be due to the usual cause—the ruin of ancient buildings.

The famous triple wall of the city is still wonderfully intact, but it has no architectural character, and, built of small stones and bricks, its appearance is anything but imposing. The same may be said for the old walls within the city dividing off certain wards or quarters. Nowhere are such imposing structures and gateways to be seen as are common enough in Cairo.

There remains, however, the one great feature of Constantinople which will always and for all time attract the attentive study of the architect and art-student—a monument of art unequalled, in some respects, in the world, and certainly the grandest creation of its epoch. Although St. Sophia is remarkably insignificant and uninteresting to look at from the outside, its mean, un-

dignified exterior serves to heighten the magnificent impression created by the first glimpse of its interior. The church or mosque—neither the exterior nor the interior suggest the idea of either use to our modern eyes—is a superb hall glowing with the colour of old age, and the always impressive glitter of gold mosaic. It is a building expressive of a completed and organically perfect type of architecture. The Byzantine style as known to Europeans through the imperfect examples of Venice or Ravenna, or represented to some extent by the contemporary Romanesque of Western Europe, is associated with the more or less second-hand use of classical details robbed from more ancient buildings, and adapted in a barbarous manner. To judge of the Byzantine style, it is evidently necessary to visit St. Sophia and study its harmony of proportion, its elegance of detail, and its wealth of colour, although this latter detail perhaps but reproduces the original mosaic design after a fashion. Much of the beauty and impressiveness of its interior may be due to a survival of the scale and general proportions of Classic buildings such as the Roman Pantheon or the temples of Baalbek. Many of the details in its carvings, the dolphins, tridents, &c., are Classical in treatment if not in execution; its mosaic decorative treatment is perhaps its most distinctive feature, and that in which it differs from older monuments. These mosaics in their present state are evidently very far from reproducing the Christian mosaics which once covered the immense vaulted areas of the ancient church. The "restoration" of the interior during the past half-century has removed all traces of the defaced figure mosaics without heads or deprived of their noses and eyes, and in a generally ruinous condition wherever not covered over with inevitable whitewash, so often referred to by writers of fifty years ago. Evidently the whole interior has been completely restored, and the mosaic work has been renewed throughout, only the four great cherubims enveloped in wings on the pendentives of the great dome remain as evidence of the original Byzantine style of the decorations. Everywhere else the figure designs have completely disappeared. The extensive spaces which must once have been filled with these figure designs are now covered with a plain gold filling-in of mosaic cubes, which has a flat and monotonous effect—an effect which is not much mitigated by the introduction of feeble oriental designs forming pateras and panels on the soffits of arches and elsewhere.

But however much the mosaic work of the interior of St. Sophia may be unlike the original decorations, there is no doubt that the actual architectural details of column and cornice are just as Anthemius of Tralles designed them. The magnificently solid proportions, the ponderous mass of walls, and the remarkably constructed dome remain apparently untouched by the wear and tear of thirteen centuries, and the singular survival of the raised platform on which once stood the Christian altar is a sufficient proof of the trifling structural change which occurred on the advent of the Mohammedan religion. The general effect of majestic and colossal construction is quite worthy of ancient Roman work such as the Pantheon or the Colosseum, and in addition there is a certain lightness of the upper parts which seems surprising in a building of such great antiquity.* Externally the building has been much repaired and restored since its conversion into a mosque, but the inevitable drab plaster spreads its monotone influence over every part.

St. Sophia must at one time have possessed many of the usual picturesque additions of the mediæval period, which have almost entirely disappeared. As has been pointed out, Constantinople is remarkable for its lost monuments, and St. Sophia seems to possess only one doorway which belongs to the Middle Ages, perhaps the thirteenth century. As a curiosity on that account we reproduce it, although it is of no architectural or artistic interest. It is a simple, deeply arched porch, evidently made up of ancient columns, of which the two outermost have ancient capitals. The whole reminds one of the similar design in St. Mark's, Venice, and it probably would be intended to have a similar mosaic decoration.

Mediæval Porch, St. Sophia.

A BOOK OF COUNTRY HOUSES.

MR. ERNEST NEWTON'S new book of designs and plans of country houses† is superior to his first one. These represent houses carried out during the last ten years; that at least is the general statement in the introduction; though there is one drawing that we think we remember at an earlier date than that would imply. We remember thinking that in the earlier set, however picturesque the exteriors, the construction was rather light and the walls of the extreme tenuity that was decently possible. This economy of material is less apparent in the present plans; though, as regards the exterior walls, their solidity is still far below that of old country houses of about the same scale. Fourteen-inch exterior walls seem to be the extreme of indulgence, even in the case of the comparatively large house No. XI., which has a frontage of 90 ft. There is a solid bit of 2 ft. 6 in. on each side of the door, but that is rather a pier than a wall. In No. IV., indeed, we have the unwonted extravagance of 18-in. walls all round, but this is a stone house on a moor. We should have liked to have seen the other houses encompassed by 18-in. external walls, and this one 2 ft. 6 in; perhaps Mr. Newton would also, and it is a question merely of expenditure. In old stone- or brick-built country houses the idea seems to have been to have at least a good thick external wall to make the interior thoroughly weather-proof; that secured, the interior partitions might be as slight as you pleased. Now the exterior walls are made no thicker than is absolutely necessary, but the interior ones are kept up to a standard of solidity and soundproof quality. This is more reasonable in a sense; but yet there is an element of architectural satisfaction in the thick exterior walls of the old houses, giving an impression of solidity and of liberality in the use of material. The modern contract system reduces them to 14 in.; with properly selected materials it is practically sufficient, but it has a meagre and skimped appearance by comparison with the old thick walls and deep interior reveals and window-seats; and it may be suggested that an architect with the tastes and perceptions of Mr. Newton, who desires to revive in modern country houses something of the unpretentious simplicity of the old country house, might do a good work by gently leading round his clients to the contemplation of thickness and solidity of walling as one element in country house architecture; and that even some interior decorative finish—and we gather that there is plenty of that in the externally plain houses shown in this book—might be sacrificed to obtain this quality of solidity of structure, more particularly in the cases where a house is built to be inherited as a family possession.

Most of the exterior views in this book are drawings, which in the main we prefer to photographs; there is more certainty in showing exactly what you want to show; the effect of a photograph is a good deal at the mercy of accidental conditions of light, and also, frequently, the impossibility of finding a thoroughly suitable standpoint. The author is careful to say that these designs are not put forward as a book of "specimens," nor the houses as "examples" to be copied; "they are given for what they are worth as the fruit of some experience." People who tried to imitate one of these houses from the drawings and plans would find, in fact, when it was done, that they had missed the particular quality of detail which gives them their special character; and the book was certainly not put out with any such object. Yet the author says that, from the rapid sale of the first book, he concluded that it must have been of some use "to house builders, professional and amateur." To other architects, especially the younger ones, this usefulness would consist, we suppose, in suggestions in planning, and in the cultivation of their own taste in regard to the architectural treatment of a country house. Without supposing any copying, a set of illustrations of this kind must have a certain effect on the mind of those who turn them over—especially those who are intending to build houses for themselves—in suggesting an ideal.

The ideal suggested is that of what the author calls "a natural architecture," which he defines as "a rational healthy builder's art expressing itself soberly through the medium of masonry and carpentry." This ideal is in opposition to the new ideals in

* The dome of St. Sophia does not, however, suggest that perfection of colossal stability of the Pantheon. It certainly is not of so marvellously perfect a construction, and will probably not survive the more ancient monument.

† "A Book of Country Houses." By Ernest Newton. London; B. T. Batsford; 1903.

architecture, especially in house architecture, which imply a kind of research after the picturesque; a research which results in the tendency to eccentricity of design and treatment which Mr. Newton happily describes as "Freak architecture." In his objection to this we are quite in sympathy with him. A country house should be reposeful in its appearance and expression; freaks of building are the reverse of reposeful, and after their novelty has worn off (or even before) they become an irritation. There are no freaks in Mr. Newton's house architecture, at all events as here illustrated. There is nothing in the whole set of designs to which the most fastidious critic could object as being in bad taste; nothing that has the least suspicion of vulgarity; and this is a great thing to be able to say. The question which might be raised is whether the architectural virtues of Mr. Newton's ideal are not a little negative.

"A healthy builder's art:" that is to say (is it not?), a return to just the putting together of walls and roofs and the placing of windows and doors, in the most obvious direct and simple manner, with little attempt at any special symmetry or any contrived effect in design. It is building houses as they were built in country neighbourhoods two or three hundred years ago. Mr. Newton does not altogether ignore the changed conditions. As he says, it would be affectation to insist nowadays on the use of local materials only, when the means of transport are so much greater. On the other hand (and we quite agree) it is legitimate to take the district into consideration. "Materials foreign to the country-side are often imported for no better reason than that the architect has a habit of design, and an inelastic mind." Where the concern is with houses of a simple and unpretending character, we are disposed rather to lay stress on the use of local materials so long as they are structurally satisfactory. Foreign materials are seldom really necessary except when there is the wish to do something more than what Mr. Newton calls "natural architecture."

Turning over the designs in this book, however, which are all pleasant to look at, it seems to us that a question may be asked, or two questions. First, is this really natural architecture from the point of view of the present day? It seems to us that it is really not so much building as it is natural to build to-day but as it was natural to build in a past generation. The old simply-built houses of the XVIIth or XVIIIth century have a charm of old world repose about them; but can we really revive that by building like them? At present there is what may be called a taste for old buildings of this description, and those built somewhat on the same lines are pleasant to that taste; but there is a good deal of sham-antique about this; and after a time we fear that these modern houses of "natural architecture" will be seen to have been rather unnatural—not belonging really to the age in which they were built. Why, to mention one point only, keep up this fiction of the necessity of high-pitched roofs and their inevitable production of useless internal spaces, when it is known that we can make low-pitched roofs quite as weatherproof? It is only for that reason that the old ones were made high pitched; it was not with any idea of their being more beautiful on that account.

And secondly, is "natural architecture," as defined by the author, all that we need ask for in a country house? We admit that all these houses are pleasing, because there is nothing in them in bad taste; but, as observed, it is rather a negative virtue. A dwelling, after all, is an artificial thing; and we cannot but think (as Mr. Solness in "The Master Builder" thought), that even a country house of moderate size is capable of being made the expression of an architectural thought, symmetrically treated and finished in detail, and that this is a higher effort that merely putting in doors and windows in what may be called a natural, but might perhaps rather be called a naïve way; and naïveté is not a proper characteristic of art; it is a characteristic of want of art. Then is there nothing to be done in the way of improving on some of these old-fashioned details; the method of roof-finishing for instance—the wooden quasi-classical cornice (a regular piece of constructed decoration) and the barge-board. In short, however one may gloss it, these irregular high-gabled houses with their windows just in a "natural" manner (and sometimes a good deal smaller than is desirable) belong really to what one may call the "hut" form of dwelling house—the hut a little developed and extended. And modern architecture ought to be able to do something more than this.

There are, however, many pleasant little fancies in these pictures of houses. The colonetted porch in No. 1; the playful finish of squares of brick and stone at top of the porch turret in No. 2; the treatment of the centre bay in the garden part of No. 8; the staircase in the same house, with the simple but effective decoration of inlay; the arrangement of balustered terraces in No. 9, suggested by the varying levels of the site; the semi-circular columned porch and the treatment of the chimneys in No. 11; the projecting semi-circular bays in No. 12, supported, as it were (æsthetically), by the strongly-marked horizontal lines of contrasted brick and stone beneath them; the introduction of ornamental cast lead facings on the fronts of the bays, between the upper and lower windows, in one or two cases; the bits of what may be called symbolical ornament occasionally occurring on the walls — lozenges, shields &c., one does not know exactly why, but which suggest some kind of meaning and give a little point of interest for the eye: all these are pleasant diversifications which appeal to our sense of the picturesque or our sense of humour—for there is such a thing as humour in building. It is all pleasant to turn over; only it is a little too like turning over a book of illustrations of old houses, not of new ones. That perhaps the author will think is the best compliment we could pay him; but we are not quite sure on that point.

Mr. Newton, of course, attaches due importance to planning; the plans show a great deal of variety in the arrangement of the sitting-rooms, and the author sets a good example in adding a compass to each plan, and tells us on what sides the garden lies in regard to the house. But we do not think the question of aspect is sufficiently considered. In some cases the similar aspect of drawing-room and dining-room is explained by the conditions of prospect; but we do not like dining-rooms facing south. A morning-room should face east, for it is just in the early morning that the sun is welcome without being inconvenient. A kitchen should face north or east; few of these do; some are due south; and in a majority of cases the kitchen window is on the wrong (which is the right) side of the fireplace, when it might easily have been avoided by a different position of the fireplace. In other respects the plans are a useful study for young architects.

NOTES.

The Value of Irrigation.

Valuable as recent irrigation works in Egypt may be to the people of that country, they have served another useful purpose in directing public attention to irrigation generally. In arid, and semi-arid, lands the utmost efforts of the cultivator are of little or no avail without the helping hand of the irrigation engineer. The benefits received by Egypt from the systematic regulation of water supplies are undoubtedly great, but are small as compared with those similarly bestowed on the people of India. The area of irrigated land in the Indian Empire is of far greater extent than in any other country in the world—a fact that is insufficiently recognised by people at home. Considering the vast areas in the British Colonies where the conditions are unfavourable for proper utilisation of the land by agriculture, it seems desirable that attention should be devoted to the remedy that is ready to hand. Capital is undoubtedly necessary for extensive engineering works, but the fact that the produce of four acres can be secured from one acre of land should be a sufficient justification for enterprise.

London County Council Training College.

The proposal of the Technical Education Board of the County Council to place the new Training College in Southampton-row, adjoining the County Council Central School of Arts and Crafts is a reasonable one. There can be no doubt that, as far as possible, such buildings should be in a central position. It is a great drawback to the University of London that it should be located in South Kensington, and the London County Council is wise to select a central site. The cost of the site will be 30,200*l.*, the payment for which will be refunded to the Technical Education Board in sixty annual payments. Unquestionably, a central training college is an urgent necessity. The mere fact that the present training proceeds partly in rooms in Clement's Inn and partly in premises lent by the London School of Economics shows how far we are behind Germany and the United States in such matters. If our manufacturers, instead of complaining that we are hampered by adverse tariffs, would do more for technical education, they would play a more truly patriotic part than by sighing for hostile tariffs against foreign nations.

Pipes and London Streets.

People who suffer from the frequent upheaval of certain busy thoroughfares may derive comfort from the consideration that efforts are being made to legislate for mitigation of the nuisance. Last year the City of London Corporation promoted a Bill to regulate and control the breaking up of streets in the City. The London County Council are arranging that paving or opening operations in streets and bridges under their control shall be carried on continuously day and night, and there is now serious talk of con-

stituting a controlling authority to regulate work throughout the metropolis, so that the minimum amount of inconvenience may be suffered by the public. Owing to the extensive use of wood-paving, street surfaces have to be broken up and relaid at more frequent intervals than was necessary in the days of granite setts, but the unfortunate thing is that the various companies still licensed to open streets at their own sweet will always seem to choose the wrong time for attending to pipes and other conduits. Ordinary business firms would gladly avail themselves of opportunities of economy by doing such work when streets were already up, but gas, water, and electric light companies appear to be as oblivious to pecuniary advantage as they are to the general convenience of those using the public streets.

Right to Light Over "Open Spaces."

THE case of Boyce *v.* Paddington Borough Council, on which we commented a little while ago, has now reached the Court of Appeal, and the judgment below has been reversed. It will be remembered that the claim was one made by the owner of a large block of flats which overlooked a disused burial ground against the defendants for erecting a hoarding in front of his windows, preventing the access of light to the same, with the object of preventing him from obtaining a prescriptive right to the light. The plaintiff alleged that as a member of the public he was entitled to insist on the space being kept open, and, secondly, that the defendants were by the statutes which relate to open spaces and disused burial grounds prohibited from erecting any building, and that this hoarding was a building. The learned Judge in the Court of first instance decided against the plaintiff's right, and held that the hoarding was not a building, and that there was nothing contained in the statutes in question which would prevent the defendants erecting such a structure to preserve rights being obtained over the space of land. The Court of Appeal have reversed this decision on the ground that the erection of this screen was inconsistent with the duty imposed on the defendants by the statutes to hold and administer the ground as an open space with a view to its enjoyment by the public. Two of the Lords Justices, moreover, appeared to think that the word "building" would embrace this hoarding, but their decision did not turn upon that point, but on the fact that the action of the Borough Council was *ultra vires*, and did not decide what rights, if any, were vested in the plaintiffs. The effect of the judgment, however, is to give the owners of buildings overlooking such spaces the right to light and air, unless some means can be adopted to prevent them acquiring such an easement.

Antiquities in Cyprus.

WE are glad to hear that Mr. George Jeffery has been appointed to what appears to be a semi-honorary position of Curator of Ancient Monuments in Cyprus. He proposes, while he occupies this position, to endeavour to arouse a more general interest in the remains of the little mediæval principality, and also in the grand ruins marking the time of the Venetian occupation. There are also in the island splendid fragments of Byzantine work, such as the mosaic at Kiti, which a peasant priest is now selling piecemeal to that class of visitors who like to carry away such spoils. Indeed, the artistic treasures of Cyprus are vanishing with alarming rapidity. During the last seven or eight years a great deal has disappeared. In Nicosia—the capital—two or three most interesting mediæval houses with richly decorated windows of the fourteenth and fifteenth centuries have been removed. A great part of Famagusta has been transported over to Port Said; at the present time, indeed, there is little of the ancient place left except the old mediæval churches (to some extent) and the fortified enceinte of Genoese and Venetian times. The new harbour works will soon have destroyed all traces of the curious mediæval harbour and its chain gate.

St. George's Hall, Liverpool.

MR. STIRLING LEE, whose fine series of bas-reliefs in the panels of St. George's Hall is now complete, has received a further commission to produce statues to be placed on the pedestals above, in the spaces between the square columns. These are to be winged figures symbolising the Spirits which should build up the greatness of a city—the Spirit of Wisdom, the Spirit of Counsel, the Spirit of Might—and so on. This is a fine and suitable idea; but we feel a little doubtful about the wings. Figures of severe vertical lines will be required to harmonise with the architectural lines, and anything like a display of wings will be apt to have a disturbing effect. We hope they will be kept subordinate, at all events.

A Notable Bridge.

NOW approaching completion at Pittsburg is a bridge which is worthy of attention as including the longest truss span hitherto built in the United States, and the third longest of the same class in the entire world. The bridge crosses the Monongahela River, near its confluence with the Alleghany, and is designed to carry the double track of the Pittsburg, Carnegie, and Western Railroad. It is proportioned for very heavy loads, and the construction is of massive yet simple character. The type chosen is that of a through pin-connected cantilever bridge, with vertical trusses and suspended centre span, the length of the cantilever structure being 1,504 ft., made up of a centre span, 812 ft. long between the pier centres, and two outer spans of 346 ft. each. Simplicity of arrangement and detail are noticeable throughout, and the structure is built entirely of standard materials, and with members adapted to the general practice observed in American bridge shops. All the members have been completed at the maker's yard, so that they could be assembled with the usual tackle provided for heavy bridge work. There is much to be said for this mode of procedure, which avoids the heavy preliminary outlay necessitated when the members are of such design that they must be laboriously built on the site. For instance, in the case of the Forth Bridge, with two cantilever spans of 1,710 ft., the principal members were of tubular section, built up piecemeal in position by the aid of an elaborate plant established at the southern shore of the firth. Again, the Lansdowne Bridge in India, with a channel span of 820 ft., has members of special design varying widely in character and dimensions. Some of them were shipped in sections to the site, and built up on false work with much labour; others were assembled whole, and erected by the aid of an elaboration of systems and appliances which involved heavy expenditure and very considerable adjustment and alteration from time to time. In addition to the unholy desire for details which preclude the adoption of standard materials and practice, English bridge engineers usually prefer field-riveting to pin-connexion, and thereby materially increase the labour and time necessary for erection.

Engine Foundations.

A METHOD, largely adopted on the Continent, of making foundations for engines and boilers is based on the use of steel-cored brick caissons, the bricks being made with two rows of four or more perforations, through which iron or steel rods are passed and grouted with cement mortar. An interesting example of this system was to be found in the foundation provided at the last Paris Exhibition for the 1,000 h.-p. Cockerill gas-engine, the operation of which caused a shock of 250 tons at every revolution. This foundation consisted of a series of caissons carried down to the depth required by the holding-down bolts, and the bolt tubes themselves were formed of armoured cement tied to the steel cores of the brickwork. A somewhat similar foundation, now in course of construction in St. James's Park, for boilers to be used in connexion with a pumping-station, is composed of caissons about 1 ft. deep with covers of armoured cement tied to the caissons. It is claimed for the system in question that it will withstand any required pressure from above, however soft the soil may be, and that engine foundations so made distribute the load to such an extent that very little vibration is transmitted. One further point in connexion with engine foundations is worthy of mention. Vibration is almost invariably debited either to the account of the foundation or to the unbalanced condition of the engine. In the case of a steam-engine it is quite as likely that the source of offence may be found in badly-designed piping, and a great deal of unnecessary trouble and expense may frequently be saved by looking in this direction when complaint arises.

Electric Power Transmission.

THE arrangement and control of long-distance transmission lines for electric power is a problem which is now engrossing the attention of electricians, and hence the paper by Messrs. Cowan and Andrews, which has recently been published in the *Journal* of the Institution of Electrical Engineers, is a timely one. Twenty miles appears to be the practical limit to the length of underground cables for transmission purposes, owing to the enormous-capacity currents required for greater lengths. The authors, therefore, discuss the possibility of overhead transmission in this country. The poles used abroad are generally about 40 ft. long, and there are about fifty of them to the mile. Steel towers for supporting the wires are, however, coming into use. In the case of a 60,000-volt installation in Mexico these towers are placed at distances of 440 ft. apart, and the total cost was practically the same as if poles were used. The objections to the use of overhead wires are danger and unsightliness. It has been

pointed out that kite flying on a damp day near a high voltage line would be exceedingly dangerous, and balloons or air-ships would be destroyed if they came in contact with it. So far as appearance goes, these power transmission lines need not be as unsightly as many existing telephone or telegraph lines, but still their appearance in most cases will be objectionable. For very high pressures the insulators need to be over one foot in diameter, and the wires need to be at least 10 ft. apart from one another, as otherwise there is a risk of arcing across, and the power lost in air leakage is appreciable. With modern lightning arresters no danger need be anticipated during thunderstorms. In some transmission lines in South Africa the arresters are seen flaming across three or four times per minute, and yet no damage is done. The Board of Trade have intimated that they are prepared to consider overhead schemes of power transmission; but it is to be hoped that the greatest caution will be exercised in granting permission for their use.

Ventilation in Workshops.

DR. KING WARRY, in his Report for 1902 on the Sanitary Condition of the Hackney District, makes some exceedingly practical remarks in regard to certain difficulties in the administration of the Factory and Workshops Acts in respect to the ventilation of workshops, owing to the divided authority in regard to ventilation and temperature. Dr. Warry says:—

"The enforcing of the law with regard to ventilation in workshops is the duty of the Local Authority; that with respect to the maintenance of a certain temperature in workshops is the duty of the Home Office through their inspectors. Now, ventilation and temperature are so closely connected, that the present division of supervision is anything but satisfactory. If, for instance, a bad form of heating arrangement is approved of by the factory inspector, by its vitiation of the atmosphere of the workshop, an alteration of the methods of ventilation may be necessary to meet this; or, again, suppose a small workshop is allowed to be heated by means of gas burners, here the ventilation must be altered to meet the circumstances. Now, ventilation and heating are so closely connected that I am of opinion they ought to be under the supervision of one authority, it matters not which, except to the occupier, who would probably be relieved of much anxiety if both these matters were settled by one inspection at the one time."

Milton's Cottage, Chalfont St. Giles.

STEPS are about to be taken for a restoration, at an estimated cost of some 300*l.*, of Milton's cottage at Chalfont St. Giles. Having been purchased in the name of trustees in 1887, the long-neglected premises were put into repair and converted into a kind of museum, Mr. J. Oldrid Scott acting as advisory architect to the trustees. The six-roomed half-timbered cottage forms one of two back-to-back tenements which had belonged to the Fleetwood family, of The Vache, near Chalfont. The part in which Milton lived faces towards the road called the Dene-way. On the front, above the doorway, are the coat-arms of Fleetwood. The trust-deeds relating to the property during longer than two centuries past have been recovered, and show that it had always been subdivided, as at present, into two separate tenements, and for some time in the interval, 1709-1737, was known by the name or sign of the "Three Compasses," a designation that survived until one hundred years ago. A deed dated April 27, 1683, rehearses its sale to one Thomas Cock, carpenter, for 63*l.*, by David Fleetwood. A wooden porch, added to the garden front since Milton's day, became decayed and has been removed, so, whilst one or two rooms are occupied, we can still see, and almost in its pristine condition, the only existing house in which it is certainly known that Milton lived.

National Competition of Schools of Art.

THIS year's National Competition of Schools of Art shows no individual work of higher merit than usual; in some of the sections a high standard is attained, others do not reach the same level as in previous years. On the whole the characteristic of the present exhibition is the greater number of designs executed and shown in the material state as well as the working drawings, which in previous years was all that was shown. This class of work covers a large field, no two pieces being comparable one to the other. There is, however, a noticeable lack of conviction about the work. Take, for instance, modelling design; the architectural setting would have been better ignored altogether than shown as it is in many instances. Miss V. E. Brunton, of Liverpool, shows admirable modelled figures, with an Alfred Stevens strength and vigour suited to architecture, but the architecture shown is bad beyond description. Very beautiful designs are shown for lace; those for damasks and wall-papers seem to us of less interest than usual. A more beautiful design for printed muslin than that by Miss S. C. V. Jarvis, of Battersea, it would be hard to find among student's work. Furniture is well represented by a finished piece of work in the form of a writing table made by Mr. Herbert Martin, of Camberwell. The architectural work is rather more deplorable than usual; and this is due not so much to the students as to the lack of instruction during the preparation of measured drawings or designs. Mr. John H. Gibbons, of Manchester, shows a design for an oak reredos and baldacchino of some originality, though the character of it is hardly a wooden one. Useful work is done by students of mechanical drawings. Several good drawings are shown from West Bromwich. It is a pity that this class of work is not more taken up, as it is a useful education for many of the more exact crafts and for most industries.

Liverpool Town Hall.

WE read with something like indignation, in a correspondence in the *Liverpool Journal of Commerce* of the 25th ult., a proposal, in connexion with the removal of the Liverpool Cotton Exchange from its present "Flags," that the Cotton Exchange should purchase the Town Hall and pull it down, and that "by this means Water-street might be widened and brought into a line with Dale-street." Among the constantly-recurring instances of the rage for architectural destruction in the present day, we do not know that we have ever seen anything more barefaced than this. Liverpool Town Hall is a historic building, which is the most important work of one of the most eminent architects of his day, and contains one of the best staircase halls and one of the finest suites of reception-rooms to be found in any town hall in England; rooms, moreover, which are designed in a refined style, far superior to that found in most of the later public buildings of the nineteenth century; and on the pretext that this building projects a few feet beyond the line of the streets above and below it, it is proposed to destroy it to widen the street, as if it were a warehouse. The proposal is disgraceful.

Supposed Portraits of the Stone Age.

A CONSIDERABLE number of persons were drawn to a room at the Langham Hotel on Wednesday, at the invitation of Mr. Auberon Herbert, to see a number of examples of what were described in the invitation as "the men of the Stone Age, sketched by themselves"; a sufficiently interesting announcement, the practical outcome of which must, we fear, have disappointed some of the guests. What we were invited to look at were a number of stones which presented rude likenesses to human heads, or in a few instances to animals. The theory is that these were selected by the men of the Stone Age as presenting natural approximation to the likeness of the human head, and chipped into a closer likeness, with holes or depressions artificially sunk for the eyes, slits chipped for the mouth, &c. This branch of archæological research has already for some time been pursued in France by M. Thieullen and one or two other students. It would be rather presumptuous to offer a decisive opinion as to the truth of the theory without a more careful and lengthened study of the examples produced; but our impression was that a good many of the resemblances were accidental. The reply to this is that the abrasions on the stones are not in the most exposed or projecting portions, as would be the case with natural wear, but in the recessed portions, and are therefore artificial. Some of the examples seemed to bear out this theory. But if human beings at some time or other amused themselves with assisting Nature in making grotesque resemblances out of oddly-shaped stones, is there enough of it to make a scientific theory of, or to fix it on the men of the Stone Age? And can we have much faith in stones picked here and there out of a gravel-pit, from among a number of others which present no peculiarity? If there had been any find of a number of these apparent grotesques all in one place, it would be a different thing. However, the question is certainly an interesting one, and we may thank Mr. Auberon Herbert for drawing attention to it and illustrating it by his own specimens from the New Forest.

LETTER FROM PARIS.

THE Paris Municipal Council has under consideration two schemes for increasing the supply of drinking water for Paris, one submitted by the Prefecture of the Seine, the other put forward by one of the members of the Council. The former scheme provides for bringing the daily supply per inhabitant to 50 gallons, not comprising river water for general purposes; and estimating the population of Paris in 1930 to be four millions, the required daily supply to be provided within the next few years will have to be 200 million gallons. Nearly half of this quantity, it is estimated, may be procured from the subterranean waters of the Val d'Orléans, in the basin of the Loire, and a fifth aqueduct, over 60 miles long, will have to be constructed. A preliminary portion of the remaining quantity required will be obtained from new supplies brought through the existing aqueduct of the Avre. The estimated cost of the work is 130,000,000 fr. The second scheme, brought

forward by Dr. Navarre, is much more economical, but would afford a very inadequate supply; this is to take off the springs at Fontaine-sous-Jouy and Cailly, near Evreux, and lead the supply to Paris through the existing aqueducts of the Avre.

The French Parliament has passed the new law concerning the interdiction of the employment of white lead in painting work in buildings. The delay of one year after which the law was to come into force has, in order to meet the interests of certain manufacturers of this material, been increased to two years. By the terms of the new law, after a delay of two years from the date of the law, the use of white lead or litharge, and oil, will be forbidden for all work of preparation, fillings, &c., for painting, and after three years the interdiction will extend to all painting work of whatever kind executed in the interior of buildings.

The City of Paris has been authorised to borrow the sum of 170 million francs for the construction of the new lines of metropolitan railways in Paris.

The Académie des Beaux-Arts has awarded the Prix Bailly, of a value of 60*l.* and destined to recompense an architect for interesting work executed and completed during the past six years, to M. Boeswillwald for his work in restoring the monuments of Carcassonne. The Prix Houlevigne, of a value of 200*l.* has been awarded to M. Toudouze for his designs for the tapestry to be executed by the Gobelins Manufactory for the decoration of the New Sorbonne. This prize was founded to recompense the author of the most remarkable work of architecture, painting, sculpture, or engraving produced during the past five years.

The "Vieux Paris" Committee approved at its last meeting the scheme submitted by M. Bouvard for the laying out of the vacant ground of the Champ de Mars, mentioned in the last "Letter from Paris." The Committee considers that the Eiffel Tower and the Galerie des Machines offer proportions much too heavy and gigantic to in any way suit the scale of the proposed embellishments, and puts forward the opinion that these two buildings should be demolished at the latest in 1910, when the present agreement between the town and the owners of the Eiffel Tower shall have expired. The Committee desires the definite widening of the Pont d'Iena in place of the temporary work which was carried out for the purposes of the 1900 Exhibition, the arrangement of the interior of the Champ de Mars in symmetrical parks and gardens, and the artistic setting out of the quays and banks of the Seine in sloping grass swards and flower gardens. The Esplanade des Invalides should, in the opinion of the Committee, be set out in the form of non-symmetrical pleasure gardens.

The archway of the new tunnel for the Metropolitan Railway of the north of Paris is showing serious signs of fissures caused by settlement in the portion next the station of the Place Pigalle. The engineers of the railway are examining into the cause and the remedy, and in the meantime heavy loads are not allowed to circulate over this portion of the line. The stations above ground of the new line on the left bank of the Seine will be of entirely different design to those erected for the existing lines; the "modern style" design for these stations is found to be too insipid and of a disappointing effect, and will be abandoned in the future stations.

M. Tournaire, the architect of the Palais de Justice at Paris, is preparing his plans and designs for the completion of the Palais de Justice, for which a large sum has been voted. The new wing will occupy the ground at present covered by an agglomeration of very old houses comprised between the Quai des Orfèvres and the Rue Sainte Chapelle. M. Tournaire has thought it well to consult the various judges on the details of the plans he is now preparing.

It has been decided to settle the much-discussed question of passing the new north-to-south line of metropolitan railway under the buildings of the Institute, by entirely changing the line of route. The line will now follow the rues Bailard and Halles and the Place du Chatelet, and will cross the river above the Pont au Change. It will then pass under the Prefecture de Police and follow the Rue Danton as far as the Rue de Rennes, when the original programme will be followed. Owing to the greatly increased depth of the various new lines, it has been decided to construct large public lifts in the station of the Place de l'Etoile and in that of the Place de l'Opéra. The depth of the line at the Etoile is about 56 ft., and at the Place de l'Opéra nearly 70 ft.

The "Vieux Paris" Committee produced a report at its last meeting, tending to destroy the long-founded belief that the Menilmontant stream passed under the Opéra and the Place de l'Opéra. During the building of the Opéra House, M. Garnier had to overcome the difficulties presented by the existence of over 18 ft. of water situated at the depth of the foundations, and it was concluded that this water came from the subterranean stream which was known to flow from the higher portions of Paris, near Menilmontant. The present excavations for the Metropolitan Railway on the Place de l'Opéra have shown that very little water now exists, and that the large quantity discovered by M. Garnier came in all probability from surface infiltrations, now prevented by the wood paving of the square, allowing little water to pass. It was announced during the meeting that the heirs of the late Sir Richard Wallace were offering to sell the domaine of Bagatelle and the historical château of that name situated close to Paris, for the sum of eight million francs. As the domaine is a very important one, and the château, built in the eighteenth century by Boulanger for the Comte d'Artois, is, according to M. Charles Normand, the most pure specimen of architecture he knows of next to the Parthenon, the Commission passed a vote to the effect that in the case of the purchase of the domaine by a private person the town should use its right to exact one opening only in the whole of the extent of the property.

M. Nenot, the architect to the Panthéon, has decided to replace the two Gobelins tapestries which now occupy the central panels of the two transepts by paintings. These two tapestries, which were executed in 1875, are completely out of keeping with the frescoes of M. Ferdinand Humbert and the compositions by M. Maillot. The work of completing the decoration of the remaining panels will fall to M. Humbert, whose compositions entitled "Patrie" fill the panels of the transept.

The work of constructing the two important new wings of the Bourse at Paris is advancing fast, the masonry work being nearly terminated. During the recent work of demolishing the old foundations of the convent of St. Thomas Aquinas, on the site of which the Bourse was built in 1808-1827, a metal box was discovered containing a statuette of the Virgin Mary and some remnants of old cloth, with an inscription relating to the ceremony of the laying of the foundation-stone of the Convent of St. Thomas in 1663. These objects have been deposited in the Carnavalet Museum.

The 8th Arrondissement of Paris, one of the richest quarters of the city, possessing a Mairie far from worthy of the quarter, after having for some time considered the advisability of forming a new Mairie in the magnificent Hotel de Paiva, situated in the Avenue des Champs Elysées, is now considering the question of demolishing the "Chapelle Expiatoire," situated in the Square Louis XVI. on the Boulevard Haussmann, and constructing a Mairie on the site. The "Vieux Paris" Committee is urgently protesting against this scheme, which would result in the destruction of a monument interesting in both a historical and an architectural point of view. This fine chapel was built by Louis XVIII. in consecration of the mortal remains of Louis XVI. and Queen Marie Antoinette, which were deposited in this burial-place, once portion of the cemetery of the Madeleine, until 1815, when the remains were transferred to the Royal burying-place of St. Denis. The building is interesting as being one of the very few public monuments erected during the reigns of Louis XVIII. and Charles X., and although very cold and classical in style, is an excellent example of the work of Percier, of a sad and imposing simplicity and grandeur quite in keeping with the object and sentiment in which it was built. It is to be hoped that the protests of the Committee will avail to save it.

The old building of the Caserne du Petit Musc at Paris has been given over to the demolishers. The "Vieux Paris" Committee has requested the Municipal Council to give orders for the preservation of all objects of historical or architectural interest likely to be found in this ancient building. A number of interesting stone consoles of the Renaissance style will be taken to the Carnavalet Museum, and the Committee requests that the fine wrought-iron staircase, dating from the seventeenth century, should be carefully preserved and re-erected in one of the Municipal buildings.

The operations of the jury formed to decide the annual competition called "Concours des façades," will begin very shortly. A hundred and five houses, constructed in 1902 at Paris, have been entered for competition.

The well-known iron foot-bridge called the Pont des Arts, which crosses the Seine between the Louvre and the Institute, is at present under repairs. This bridge is interesting in the fact that it was the first bridge with iron arches constructed at Paris; next year will be the centenary of its existence. It was constructed by a company that for a number of years took toll from those who crossed the bridge, and it took its name from the present Louvre, which was at that time called "Palais des Arts."

The Académie des Beaux-Arts has awarded the Grand Prix de Rome to M. Etienne Joussely, pupil of MM. Daumet and Esquié. The subject given for the competition was—"A public place with a long avenue bordering a river, and with three important buildings: a bourse, a military club, and an art club." The young architect who has gained the prize has made a fine scheme out of this very suggestive and interesting programme. The principal second prize was awarded to M. Jean Wielhorski, pupil of M. Laloux, for a design which is very successful in a rather academic way; and the second second prize (so to put it) has been awarded to M. Henri Joulie, a pupil of M. Pascal, whose design, well studied as a whole, is rather spoiled by a principal building which looks too suggestive of a railway station.

According to precedent, the National Fête (July 14) has been made the occasion for conferring honours on various artists. M. Boeswillwald, the Inspecteur Général of "Monuments Historiques," has been created Officier of the Legion of Honour. Among the new Chevaliers of the Legion of Honour are M. Guifard, the decorative painter who assisted Ballu in the decoration of the Hôtel de Ville, and M. Daumet, the architect for the restoration of and additions to Chantilly—an honour bestowed rather late in the day. Other Chevaliers are M. Jeannin the flower painter, M. Cordier the animal sculptor, M. Vernier (engraver), and M. Morin Goustiaux, architect of the fine "New York Hotel" in the Boulevard des Italiens.

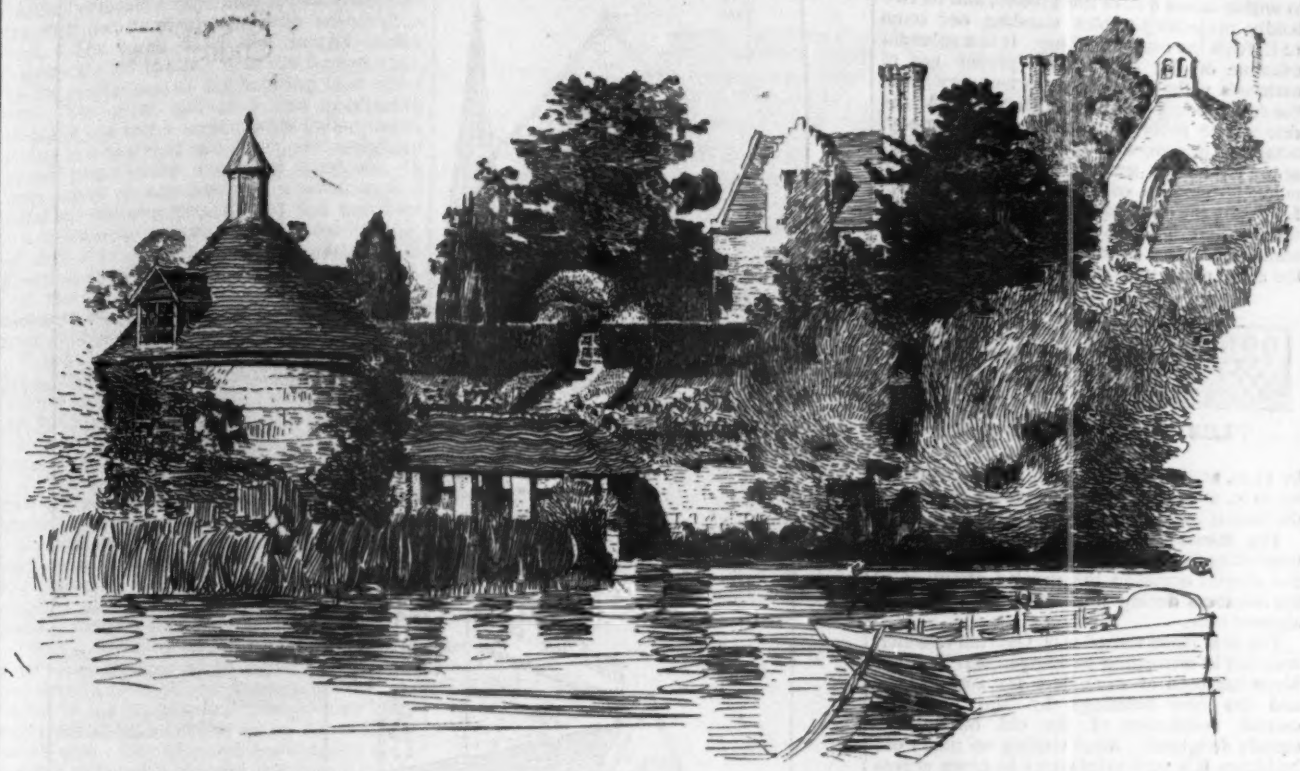
M. Saglio, who has been an admirable curator of the Cluny Museum, has retired, and his place has been taken by M. Harancourt, hitherto Director of the Museum of Sculpture of the Trocadéro; but the appointment has been a good deal criticised, the new curator not being credited with the archæological learning which was so conspicuous in his predecessors, du Sommerard, Darcel, and Saglio. M. Enlart replaces M. Harancourt at the Trocadéro.

Before separating for the recess, the Paris Council has passed a vote for 60,000 fr. for the decoration of the principal cupola of the Petit Palais, to be carried out by M. Albert Besnard, who is to paint in the cupola four large compositions, symmetrically arranged, symbolising the industrial, scientific, literary, and artistic glories of Paris. In connexion with this building we may add that M. Georges Cain, Curator of the Musée Carnavalet, is also to be Curator of the Petit Palais, with M. Henri Lapauze, the art critic, as assistant curator.

M. Ernest Barrias, the sculptor, has completed his fine design for a clock and its surroundings for the new buildings of the Bibliothèque Nationale at the angle of Rue Colbert and Rue Vivienne. A head of Minerva surmounts the clock face, which will be in white marble with bronze hands. Above is an owl, modelled by M. Gardet, as the symbol of the hours of night, on the right of the clock is a figure representing Day, on the left a heavily-draped one with a torch, representing Night. Above the whole is the figure of a young girl turning over a book, representing "Study." On the ground floor is a pediment with a figure of a cock, signifying Dawn, also (like the owl) modelled by M. Gardet.

The new Japanese museum, a legacy of M. Adolphe d'Ennery, is shortly to be opened. It has been arranged by M. Emile Deshayes, at No. 59 Avenue des Bois de Boulogne. On the ground floor is a large room intended for lectures; on the first floor five large rooms contain the collection, amounting to about six thousand objects divided into three classes:

GRAFTON MANOR HOUSE PIGEON HOUSE AND CHAPEL FROM THE WATER.



(1) Furniture; (2) Wood carvings of animals; (3) Ceramic work, vases, and netsukos. M. Deshayes, who has carried out the arrangement admirably, is also curator of the Guimet museum.

The Sèvres manufactory, though in the main a very conservative institution, has been experimenting in some modern applications of ceramic work. Among these is a monument to be erected at Châville, to the late Colonel Guillon, who died in the Madagascar campaign. The monument, modelled by M. Boverie, the sculptor, has been executed entirely in polychromatic stoneware. The firing has been quite successful, and the cost of the work very moderate.

Following a suggestion of the Prefect of the Seine, the Department of Public Works is considering what means can be taken to keep in check the disfigurement of the Parisian suburbs by advertisement posters. It seems to be considered an easy matter to deal with, especially as the railway companies, which are anxious to satisfy their customers, are believed to be quite ready to abandon the display of advertisements if called on to do so. It is hoped that this movement in the Department of the Seine will spread to the whole of France, where at present the country neighbourhoods are greatly disfigured by advertising placards.

The Paris newspapers have been talking of a proposed retirement of M. Bouvard, the Directeur des Travaux d'Architecture, before his actual time of superannuation, and of his making over his place to M. Formigé; but we do not believe that M. Bouvard, who has held the post ever since the death of Alphand, has any serious intention of the kind.

The death is announced, at the age of fifty, of M. Paul Joseph Janin, the painter, a former pupil of Jules Lefebvre and Bouguereau. He had made a special study of pre-historic subjects, to the treatment of which he brought archæological learning as well as artistic ability. He had exhibited this year, at the Old Salon, a picture entitled, "A Decorative Painter of the Stone Age." He had obtained medals at various exhibitions.

THE SANITARY INSTITUTE.—At an examination in practical sanitary science, held in Liverpool, on July 24 and 25, 1903, four candidates presented themselves. The following three candidates were awarded certificates:—J. Hatton; J. W Davison; J. J. Quirk.

GEOLOGICAL MUSEUM, JERMYN-STREET.—The museum will be closed during the repainting of the interior from August 1, 1903. The business of the geological survey will be carried on as usual, and all visitors coming to the museum for special information may obtain admission.

THE ARCHITECTURAL ASSOCIATION ANNUAL EXCURSION.*

ON Wednesday morning the weather was very wet and uninviting, but a start was made from Worcester by train to Droitwich, which was reached about 9 o'clock. Here carriages were in waiting to convey the members to Hampton Lovett, about a quarter of an hour's drive, the rain still coming down most persistently. On arrival, however, the church was quite worth any discomfort endured in getting there. It consists of a nave, chancel, and chapel on the north side opening into the chancel and nave by one arch in each, and the pier between the arches has been pierced in recent times to allow of another sight into the chancel. The building has some Decorated windows, but is chiefly of the Perpendicular style. The tower is on the south side and forms the porch. There are some interesting monuments in the church to Sir John Packington, who is considered to have been the Sir Roger de Coverley of Addison. A window on the north side of the chapel contains some beautiful glass dated 1561. In the churchyard is an old cross restored by Hardwick in 1849. Grouped round the top are statuettes of the four Evangelists under canopies with their symbols. During the visit here the weather fortunately cleared up, which made the drive to the next place on the programme a very enjoyable one. Harvington Hall (see lithograph in last week's issue) is a most picturesque moated house, consisting of many brick gables grouped together in an unusual way, varying in height from three to four stories. There is very little here, however, of architectural interest, the inside being generally in a ruinous state, of bare walls without chimney pieces or panelling of any sort, with the exception of one or two rooms, and these are hardly of sufficient merit to note. There is, too, a massive oak staircase of good width and height, the details being somewhat coarse, but very suggestive for treatment in a better way.

The village of Chaddesley Corbett with its church was the next visit on the programme. It contains many interesting old buildings in the half-timbered style of the neighbourhood. The Talbot inn (see lithograph), facing the church, is a quaint building, with its two projecting porches having some six steps leading into them to reach the ground floor, which is raised some height above the ground. The church has a nave, chancel, aisles, and north chapel, the latter being divided from the chancel by two arches.

* Concluded from page 102.

Some portions of the church are Norman work, of which the font is a good specimen. The church is in the Decorated style, the windows here being of an elegant design—the large east window loses a good deal internally by having very poor stained glass. There is also a good sedilia.

In the North chapel are two recumbent figures of a Crusader and an ecclesiastic, and at the east end of the nave is a slab of fifteenth century work, with brass figures of Thomas Forest, keeper of Dunclent Park, his wife, and eleven children. A horn and feathered arrows are added to show his calling.

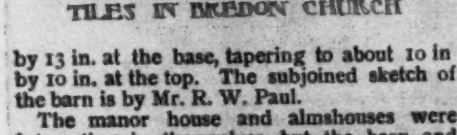
Leaving here about four o'clock, a rather long drive brought the party to Grafton Manor House, which for several years was the residence of the Talbots before Alton Towers was erected. This house is picturesquely situated, and the grounds surrounding it are interesting. The garden front is architecturally the best, and, with its prominent chimneys and high dormers with stepped gables, makes a most pleasing composition. A sketch of the house as seen from the river is appended, and other sketches from Grafton Manor will be found in our last week's plates. The members spent a very pleasant hour here, and tea was provided on the front lawn—a form of hospitality always appreciated, coming as it does at a time when the hard work of the day is accomplished.

On leaving here the brakes took the party to Droitwich Station, whence the train conveyed them back to head-quarters.

On the following morning a train journey, of some twenty minutes' duration, to Aschurch station, where carriages were in waiting, commenced the proceedings for the day, the first place visited being Bredon, where the church, barn, manor house, and almshouses occupied the attention of all during the stay of one hour.

The church consists of a nave, chancel, north aisle, and chapel in the south side of nave, with a central tower between the latter and the chancel. Externally it is a building of a very picturesque nature, owing to the happy grouping of its various parts. We append a plan and an exterior view of the church, supplied to us by Mr. R. W. Paul. In the chapel, which is Early English in style, there is a beautiful monument of Elizabethan character, the whole being well designed and carried out with the most refined details. It has two recumbent figures, male and female, with groups of kneeling figures on either side, consisting of four sons on the one and two sons and two daughters on the other. There is a tomb of similar design to this one in Cirencester Church, which was visited by the members of the A. A. excursion some two years ago. A sketch of the porch is given on the lithograph plate.

The barn which is near the church is a very fine one, with its enormous roof raking down to within about 8 ft. of the ground, and its two boldly projecting gables standing out some 12 ft. from the main building. It is a splendid example of the simple and proper use of materials without fuss or effort of any kind, the result being entirely satisfactory. At the side of one gable is a quaint stone chimney, octagonal in plan, with small arched openings at the top having small gablets over each, the whole terminating with a stone pyramidal cap. Internally the roof supports are massive and well constructed, the timbers being of large scantlings. The principals are 12 ft. apart, the main posts supporting them being 13 in.



TILES IN BREDON CHURCH

by 13 in. at the base, tapering to about 10 in by 10 in. at the top. The subjoined sketch of the barn is by Mr. R. W. Paul.

The manor house and almshouses were interesting in themselves, but the barn and the church occupied the greater attention of the members during the somewhat short stay allowed here.

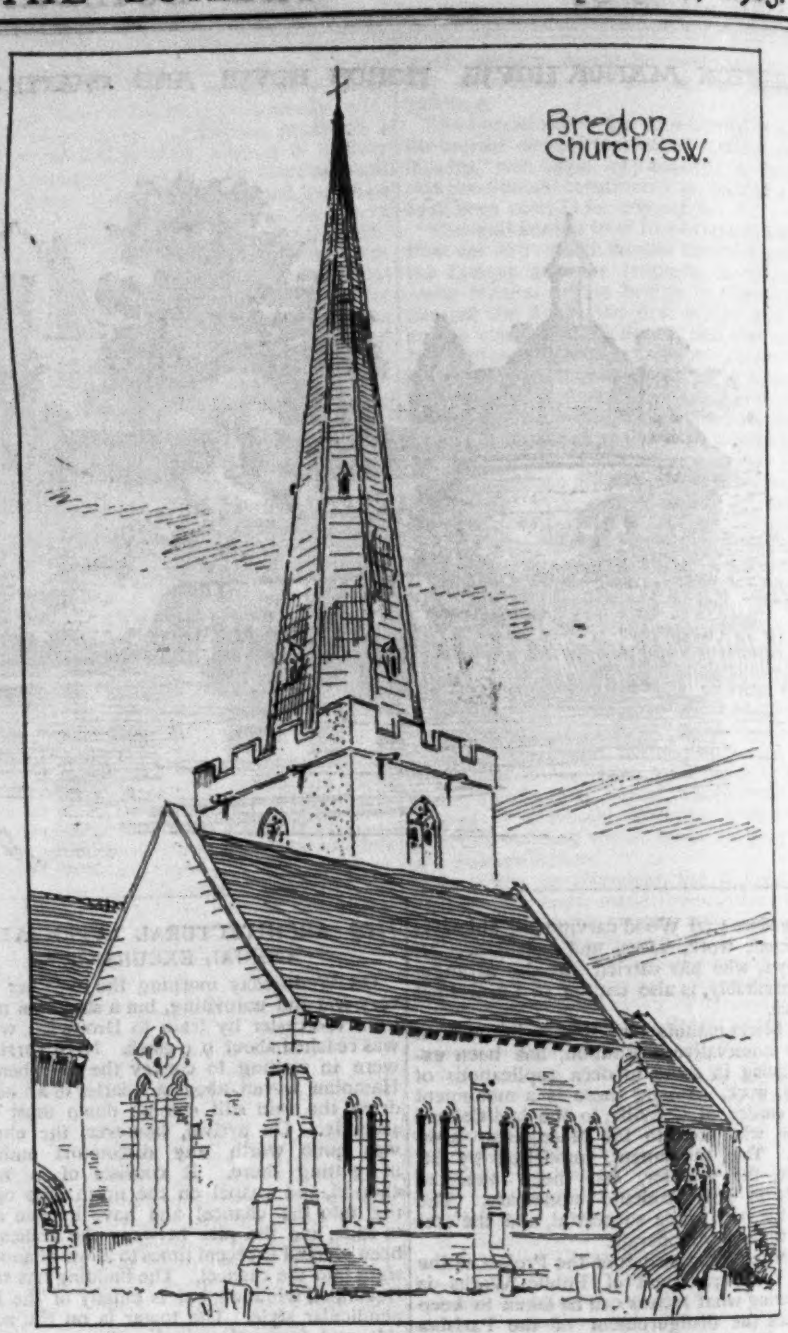
The next place visited was Overbury, which was rich in interesting buildings. Mr. Norman Shaw has been at work here for some years, and the new buildings by him and the careful restoration of the old ones were equally delightful. After visiting so many old buildings, it is very satisfactory to come across modern work like this which compares so favourably with it.

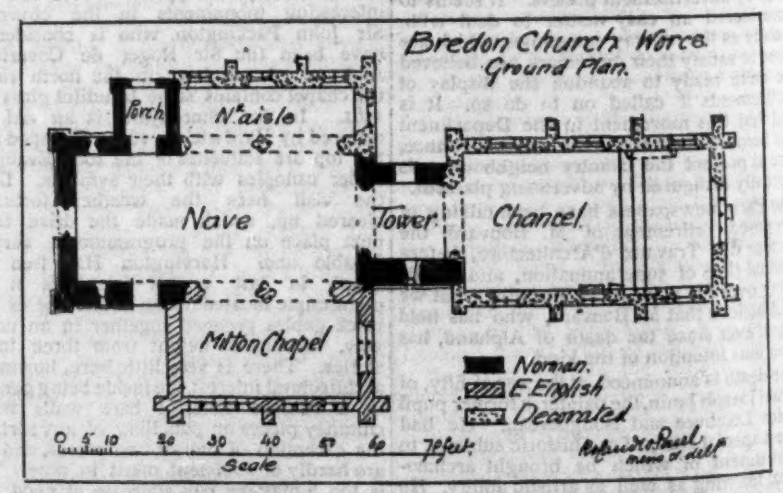
The greater part of the time here was spent in wandering about the village, which is so

IN BREDON CHURCH

prettily situated, and looking at the various buildings, which included the schools, built in local stone, and on which the bell-turret is so prominent and happy a feature, a shop with half-timbered projecting upper story, and a very quaint well with seats on either side. The village hall, higher up the hill in another street, is a much later example of Mr. Shaw's work, and is admirably suited to its purpose in every way.

The church consists of a fine first pointed chapel, Early Norman nave, with low Norman arcade and middle pointed aisles and tower. The bowl of the font is Norman. The tower externally is simple and well proportioned, and





the whole building strikes one as being a typical example of a simple church.

After luncheon, which was partaken of in a field under the welcome shade of some large trees, a visit was made to the Court, the residence of Mr. Robert Martin. The estate was purchased in 1723 by John Martin, Esq., a banker of Lombard-street, who erected a new mansion, which, in 1735, being burnt down, the present house was constructed on its site. This again has been added to in recent years by Mr. Shaw, who has made a new entrance and gallery right through into the garden—dining-room, billiard-room, with kitchen and servants' offices. It is needless to say that the new work is quite up to Mr. Shaw's great reputation, and thoroughly upholds the position of English domestic architecture.

It is an unwritten rule with members of the Architectural Association Excursion that the work of contemporary architects is not to be measured up, so that, although there was so much to note, the members refrained from adding to their already well-filled books.

From here a long drive through charming country to Wollas Hall (see lithograph, where, however, our artist has incorrectly written it "Woollas") the last visit on the programme for the day. The house is delightfully situated on an eminence, and commands

extensive views. The brakes had to be left about a quarter of a mile down the hill, the roads being too steep for the horses. The building presents a venerable appearance from the dark but durable stone with which it is built. The porch bears the family motto, "Memorare Novissima," with the figures 1611, but the greater part of the building is of older date. The great hall is a fine apartment, having at one end a screen with gallery over. It rises to a height of two floors, and is lighted by well-proportioned mullioned windows. A large recess on one side, with a window, is a useful and pleasing feature. On the top floor is a curious chapel with a segmental ceiling. An arch over the altar rails in plaster, with some well-modelled enrichments, is interesting.

In the bedrooms are several fine chimney-pieces of more or less elaborate design, and some good panelling, all in oak.

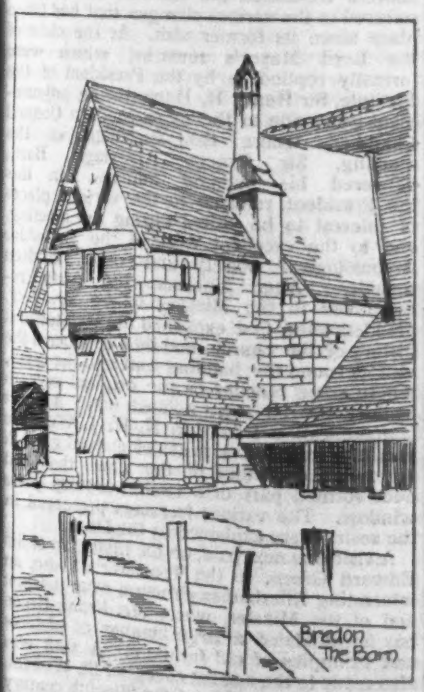
Externally it is a picturesque many-gabled house, with a projecting porch having an oriel window above it. The lead rain-water heads and down pipes were worthy of note, and the whole place was characteristic of a type of house of the period in which it was erected.

A drive to Defford Station, and thence by train to Worcester, ended a pleasant day spent among much very interesting and varied work.

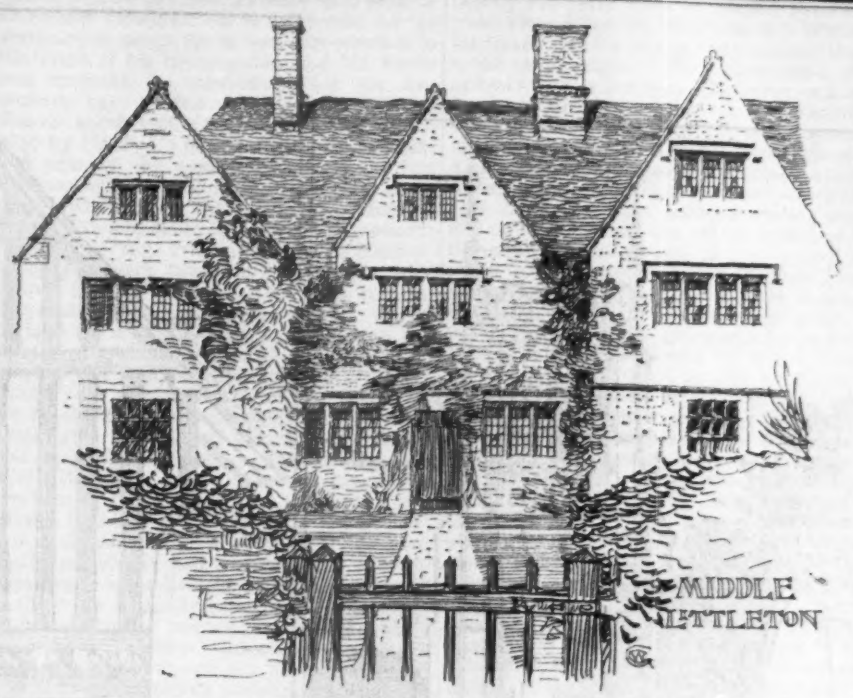
On Friday morning the railway was again made use of, the members leaving the Shrub Hill Station at 9.10 for Evesham, where the carriages picked them up for conveyance to Smith Littleton Manor House.

This is a charming house, built in 1721, and a very fine example of its style. It has not been lived in for over 100 years, with the exception of the kitchen and one or two back rooms, which are inhabited by an old villager and his wife. The windows have mostly been plastered or boarded up, and the house inside generally stripped, but enough remains to show that the whole is the work of a mind that thoroughly understood the importance of simplicity in the small details as well as in the larger.

On the right-hand room in entering at the principal entrance is a plaster ceiling very beautifully modelled, which received a good deal of attention both from the pencil and the camera. The staircase, too, is good, and the design and proportion of the balusters quite satisfactory. In fact, it struck one that this was a very complete house, every detail seeming to be of about the right weight, whether it was the doorway with its projecting hood—the main cornice—dormer window, or the crowning turret on the roof. The house and grounds were completely taken possession of by the members of the excursion, and even those who had no doubt been working all the week in making mental notes seemed compelled at last to take out a note-book and two-foot rule and follow the lead of their more energetic



companions, so that at the allotted time of the duration of the visit to this old-world house, with the mystery of its emptiness, had been pretty completely measured up and it was regretfully left.


MIDDLE LITTLETON

TITHE BARN LITTLETON

Opposite was the church, which had been restored some time since. It has a pleasing and simple oak porch, and the churchyard contains some tombstones dated 1804-1818 of very refined design.

After leaving here, a visit was paid to Middle Littleton Manor House, now a farmhouse (see sketch). The plan of this is in the form of the letter H, the hall forming the centre connecting the two wings. The stone paving in the hall is interesting, a pattern being formed by the arrangement of the stones in different shapes and sizes, which is very effective.

Adjoining the house is a large barn (see sketch), built in masonry of very small courses with a single large roof covering the whole. It is 150 ft. long and has lofty archways for the doors. It is somewhat similar to the one at Bredon, but not so fine. The church consists of nave, chancel, north transept, south aisle, with a tower at the west end. It contains little of interest, and has been restored in a manner that leaves much to be desired.

The afternoon was spent at Evesham, which is well known on account of its ancient history. The town contains many buildings of interest, and in walking round one sees many things to admire. It was early chosen as the site for a monkish establishment; to that the town owes its existence; and the most conspicuous object remaining is the stately tower of the abbey, which was founded in the eighth century by a Saxon saint Egwin, who, a victim to false charges, was sent to Rome a prisoner in fetters, when lo! a salmon caught in the Tiber was found to contain in its stomach the key of his fetters, which he had cast into a pool in the Avon before setting out! This miracle was regarded by the Pope as a sufficient refutation of the accusations, and the saint was sent home to found his abbey in peace. Evesham became a mitred abbey, and, when in prosperity, it was one of the largest in the kingdom. It continued to enjoy splendour and wealth until the Dissolution, but then was so entirely swept away that Leland, in 1540, describes the abbey as "gone, a mere heap of rubbish."

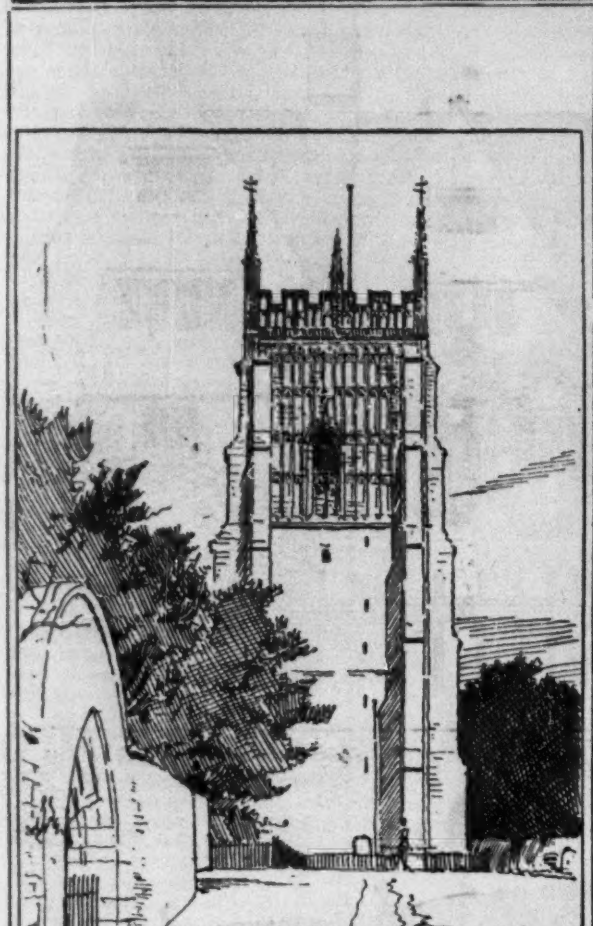
The chief relic of the abbey is the tall bell tower, built in 1533. It is an elegant and well-preserved Perpendicular structure, covered with rich panelling in good condition. It is 22 ft. square at the base, and rises to a height of 117 ft., with buttresses at the angles, and is adorned with battlements and pinnacles and possesses the character of great magnificence.

Within the churchyard stand two churches, both founded by the monks as parochial chapels. St. Laurence, chiefly of the sixteenth century, has been restored, together with its elegant Perpendicular south chantry, with rich fan tracery roof and panelled walls. The east end is a good composition, with a double row of panelling externally and delicate angle buttresses. All Saints, restored in 1876, has a richly decorated mortuary chapel of Abbot Clement Lichfield, with handsome fan vaulting.

Beyond the churchyard are some interesting houses, one in particular having some very fine wrought-iron gate railings.

In the road leading to the station is a prominent house of the Queen Anne period, and permission was given for the members to go over it. It had a fine wide staircase, of good design, and some rooms of considerable interest, and in the garden there was a very fine sundial of most elegant design.

Worcester was reached soon after six o'clock.



After dinner one of the members gave an exhibition of photographs on a large sheet in the smoking-room which was very much appreciated, the buildings illustrated being interesting from an architectural as well as an archæological point of view. This was followed by an impromptu concert, which brought out considerable latent talent, and a thoroughly varied entertainment continued, which lasted well into the night. While this was in progress members had an opportunity of seeing each others' work during the week, the sketch books and drawings being laid on the table. This is always very instructive, and gives younger members an opportunity of seeing the quality, as well as the mere quantity, of useful notes, and how to measure up the main lines of a building in the simplest and least confusing way.

Saturday was given up to visiting the most interesting buildings in Worcester city, the chief among which is, of course, the cathedral, where the members assembled at eleven o'clock. Time, however, allowed of only a hurried look round, the building being too vast to see properly in detail during so short a visit.

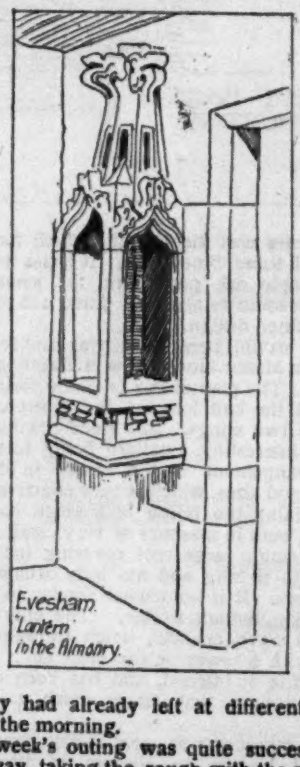
The Guildhall, finished in 1723, is a handsome example of Queen Anne architecture, built of red bricks, and having stone dressing to the windows and doors. These, however, being painted, absolutely spoil what would otherwise be a most charming front, with its recessed centre and projecting wings. Why do people think it necessary to smarten up these old places? It has the effect of so marring them, that it is not to be wondered at if they are passed unheeded.

Opposite to the Guildhall is a very refined little front, of somewhat Grecian feeling, forming the entrance to the Museum. It was erected during the earlier part of the nineteenth century.

The Commandery adjoining Sedbury on the eastern side of the canal is a historical old building, although only the Commander's house and great hall remain. Of the latter, the roof, minstrel's gallery, covered canopy over the dais, Oriel window, and Solar room, are interesting portions.

A few members met at lunch, but the majority had already left at different times during the morning.

The week's outing was quite successful in every way, taking the rough with the smooth, and with the exception of two half days of unsettled weather, there was nothing to be desired. The thanks of every member is due to the honorary secretaries, Mr. Talbot Brown and Mr. A. W. Hennings, who worked so hard and unselfishly to give them an enjoyable and instructive week's entertainment.



Church, Skelmersdale.—The foundation stone has just been laid of the new parish church, Skelmersdale. Messrs. Austin & Paley, of Lancaster, are the architects, and Messrs. J. Thomas & Sons, of Lancaster, the general contractors. The total cost is estimated at 9,000*l*.

THE ROYAL ARCHÆOLOGICAL INSTITUTE AT YORK.

After an interval of nearly sixty years, the Royal Archæological Institute has again selected York as the place of its annual meeting. The proceedings commenced at noon on Tuesday, the 21st ult., when the members to the number of over 100 were received in the ancient Guildhall by the Lord Mayor, Alderman Edwin Gray, who in a brief address welcomed the Institute to York, and referred to the various changes that had taken place since its former visit. At the close of the Lord Mayor's remarks, which were formally replied to by the President of the Institute, Sir Henry H. Howorth, an adjournment was made to the more modern Council Chamber, where the President of the meeting, Sir George Armytage, Bart., delivered his opening address. In this the President referred to the various places of interest to be visited during the meeting, and to the excellent work of the Yorkshire Archæological Society and other kindred societies. After luncheon the party reassembled in the Minster, where Mr. J. T. Micklethwaite first explained the architectural history of the church, and then conducted the visitors round the building and into the crypt, where some remains of the original seventh century church were pointed out. A short communication from Mr. N. H. J. Westlake was also read, on a panel of stained glass in the north clearstory of the nave, that had once formed part of a twelfth-century Jesse window. The various treasures preserved in the vestry were explained by the Dean.

A visit was next paid, on the invitation of Sir Edward Green, to the Treasurer's house, an interesting Elizabethan structure near the east end of the Minster, where Mr. Frank Green has accumulated a large number of pictures and examples of old furniture. A visit was also made to the ancient college of St. William, the buildings of which, of the fifteenth century with seventeenth century alterations, have been lately bought as a church house for the laymen of the Convocation of York.

At the evening meeting, in the museum of the Yorkshire Philosophical Society, a paper

was read by Mr. T. M. Fallow on "Yorkshire Goldsmiths and their work," with special reference to the local marking of plate at York, Hull, and Leeds. A number of interesting pieces were exhibited in illustration of the paper.

On Wednesday, the 22nd, the party proceeded by rail to Howden, where the magnificent church was first inspected. The choir is now in ruins, owing to its having formed the church of a college of secular canons suppressed at the Reformation. The nave and transepts and the grand central tower had escaped a similar fate through their having formed the parish church of Howden. The architectural history was lucidly explained by Mr. John Bilson, who pointed out that the now ruined choir had replaced an earlier one of the same date as the transepts, but without aisles, built about the middle of the thirteenth century. The reconstruction of the church had afterwards been continued westwards, and the existing nave and aisles were fully developed work of the last quarter of the thirteenth century. The completion of the church westwards was followed by the building of a new choir with aisles, the existing ruins of which showed that its eastern gable must have been a composition of exceptional beauty. The only later additions were the lantern of the central tower, the work of Bishop Skirlaw, and the lovely little octagonal chapter house, now reduced to a sad wreck, on the south side of the choir. Mr. Bilson also called attention to the interesting series of monuments, including a cross-legged effigy of a lady on a tomb in the south transept. After a perambulation of the outside of the church, a brief visit was paid, also under Mr. Bilson's guidance, to the adjoining remains of the manor house of the Bishop of Durham, which include the hall and porch of Bishop Skirlaw and a gateway built by Bishop Langley.

After luncheon carriages were in readiness to convey the party to Wressle Castle, an interesting late fourteenth century example of the transition from the purely military stronghold to a fortified house, in the form of ranges of chambers arranged round an open court, with towers at the angles. Only one side of the square now remains, but Mr. Bilson showed by the aid of a plan what had been the original arrangement, and by quotations from letters and other documents, what had been the fate of the building owing to its share on behalf of the King during the Great Rebellion.

From Wressle, the party returned by train to Selby, where Mr. J. T. Micklethwaite called attention to the chief features of the abbey church, which is well-known for its noble fourteenth century choir, and a nave which seems to have been the result of repeated experiments on the part of its twelfth century builders. The monastic buildings have unfortunately been entirely destroyed.

At the evening meeting Mr. F. Haverfield read a paper on Roman Yorkshire, with special reference to the traces of a purely military occupation, as shown by the various forts of which remains exist, and to the evidences of merely civil settlements to be found at York, Aldbrough, and elsewhere.

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS:

WALTHAM ABBEY AND NEIGHBOURHOOD.

ALTHOUGH the annual excursion was in progress at the same time, the fourth of the present series of Saturday afternoon visits, on July 25, attracted thirty-five members to Waltham Abbey and district.

Essex is here rapidly losing its quiet rural character and giving place to that cheap newness, now so typical of the outskirts of all large towns. Although not a stone producing county, brick, timber and plaster have for centuries been used in a combination that has become traditional and it is satisfactory to find a fair number of pre-nineteenth-century domestic buildings still in occupation in the town of Waltham Abbey. Stepping from the modernised main street into a small open square, curiously named Romeland, with scarcely a modern note in it, one is forcibly reminded of the contrast in social conditions of the Georgian and Victorian eras. But popular attention is naturally directed to the Abbey. The visitors were here met by Mr. J. A. Reeve, who, having made careful drawings and a minute study of the fabric some years ago, gave a dissertation upon its archæological history, together with certain theories based upon what he found and measured. It is but human for the antiquary to assign the earliest date possible to the object of his investigation, and Mr. Reeve was emphatic in concluding that the five western bays of the church were built by Harold about 1060 A.D., and the two eastern bays by Henry I.; this is somewhat speculative, although the evidences point to the fact that two distinct building operations took place in Norman times.* Any detailed account of this well-known abbey is perhaps unnecessary; suffice it to say, briefly, that only a Norman nave, a western tower and a unique lady chapel, both of Perpendicular date, remain. The church is said to have had its choir walled off from the nave, thus limiting the use of the former part to the priests, so that it became necessary to build the lady chapel in its present position on the south side of the nave; all traces of this choir have vanished. A very remarkable feature of this grand Norman interior is the east end — built by the late Wm. Burges in 1860; a coarse, discordant erection in the style of the bastard Early French Gothic so much affected at that period; it is, at the same time, a good example of unrestrained liberty and a courageous effort to perpetuate an individuality. The stonework of the tower is rapidly decaying, probably from its being wrongly bedded; temporary covered ways have therefore been placed round this part of the churchyard for the protection of pedestrians from falling material. In the lady-chapel the graceful stonework is no less deserving of admiration than the solid massiveness of the Norman builders; the fenestration has a particular character, of which the double tracery of the large west window is somewhat unusual, although delightful. The peculiarity of this lady-chapel, however, is its floor level, which is some 7 ft. above the nave floor line, and below which is an interesting vaulted crypt, now used as a coal cellar. The shooting and drawing of fuel is causing serious and unnecessary damage; it is to be hoped, therefore, that this practice will soon be discontinued and a careful restoration applied to what should prove a worthy acquisition.

A drive of about three miles in the direction of Epping brought the members to Warlies, where a small modern church was visited. It is somewhat unusual to find the design of a new village church based on the tradition of the ecclesiastic edifices of the county, but here the spirit of the timber and plaster structures of Essex has given the key to the charming character which this small fabric possesses. Dedicated to St Thomas, it has been built by Sir Fowell Buxton as a gift to Lady Victoria Buxton, and intended to provide for services hitherto held in the school. The plan consists of a nave 60 ft. by 18 ft., a north aisle 9 ft. wide, a spacious chancel and a timber bell tower, the construction of which is carried through to the nave floor and made visible from the interior of the church. The walls are built of brick plastered inside and out; the dressings to the buttresses, doors and windows, are in Chilmark stone; the fine broad roof is covered with tiles and the spire with oak shingle. A very effective feature is the oak arcade between the nave and aisle, with which are framed the open timber roofs; English oak of large baulk is used, in which the wooden detail shows considerable study. There is no imitation of any particular period of old work, but an individual treatment has been introduced, while the feeling of fifteenth-century religious craftsmanship is revived. Messrs. Freeman & Ogilvy, the architects, are to be congratulated in making a thoughtful and restrained use of an opportunity in which the prevalent element of minimum cost was not the chief factor; and the result of their labours is such that this little church at Warlies worthily takes its place amongst the best ecclesiastical work in Essex. The more decorative parts—the carvings and the modelled plaster ceiling of the chancel, by Mr. Lawrence Turner, and the metal work by Mr. W. P. Reynolds are sympathetic yet individual in treatment; other fittings are equally satisfactory.

After partaking of Sir Fowell Buxton's hospitality the party drove to Copped Hall, two miles away, where the owner, Mr. E. J. Wythes, kindly received the visitors, and conducted them to the various parts of the gardens and to one or two rooms in the house. Standing on a hill (as the name suggests) this site has considerable archæological interest, having first accommodated a monastic settlement, then a splendid Elizabethan mansion, and, subsequently, a large Adam house; it is with the latter that we are now concerned. The sixteenth-century work was pulled down and the old material used in the existing house erected in 1750, some fifty yards from the old site, by Sir Reginald Newdigate. Robert Adam's design was severely simple in its interior; but in recent years it has assumed an ornate appearance, a treatment such as many other houses by this architect have received during the last fifty years; here, as elsewhere, if the original yellow brick elevations suffered from extreme plainness, the application of embellishments is certainly no gain from the point of view of architecture. With the exception of the roof and chimneys on the house, most of the work now seen is the design of Mr. C. E. Kempe, who is well known for his beautiful stained glass. To the simple features of the eighteenth century house have been applied architraves, cornices, balustrades, and large scale carvings. Additions are visible in a large block at the north end, and in the stone arcade terraces to the west front, whilst a large Italian garden (recalling Montacute) with stone balustrades, flights of steps, and two small pavilions, has been laid out on the west, together with a large winter garden and enclosed Dutch garden on the south. Time prevented a detailed inspection of the place, but first impressions certainly produced not a very favourable opinion upon the result of some most extensive labours.

This concluded an incomplete afternoon's work, for it was felt that rather too much had been attempted in the short time that remained after making a late start from town.

* Our opinion on this point, with the reasons for it, is summed up in a "Note" in the *Builder* of June 25, 1898 (page 606). Our conclusion was that the evidence of the building itself is against the Saxon theory, and that it was all built by the Normans, though with a slight break in the work, between the five western and the two eastern bays. This interruption in the work can only have been for a comparatively short period.

BRITISH ASSOCIATION OF WATER-WORKS ENGINEERS.

THE members of the British Association of Waterworks Engineers held their annual conference in Bolton during last week. The Conference was opened on the 21st ult. in the Council Chamber of the Town Hall, when the Mayor of Bolton (Mr. Alderman Miles) gave the delegates a hearty official welcome. The President for the year is Mr. R. H. Swindlehurst, the Engineer of the Bolton waterworks.

Mr. Swindlehurst, in his presidential address, spoke of the growth of the Association, which now contains 286 members, or twenty-four more than in the previous year. The great value of the Association lay in the opportunity it gave, through the reading and discussion of papers, of the interchange of knowledge and ideas on points of practice. The duties of the waterworks engineer, if carried out aright, had a most important bearing upon the improvement of the health and prosperity of the people. Statistics showed clearly that the expenditure on the improvement of the water supply in the larger towns had resulted in a saving to the community, and no one could fully estimate the benefits conferred on our crowded centres of population by the introduction of a pure and abundant water supply. In spite of this, the difficulties and opposition met with when such schemes were mooted were often very serious, and the public needed to be shown that money expended on the improvement of the water supply was a good investment, and that it was to their own interest that the works should be of the best and most perfect description. Going on to deal with questions affecting variations of the rainfall in different districts, and methods of filtration, he said that of course the purity of a water supply was a matter of the highest importance. Although it was true that waterworks engineers succeeded in making good and effective filter beds long before they knew anything at all about microbes, it must be admitted that recent researches in the domain of the bacteriologist had helped the engineer to a better and more thorough knowledge of what he was about, and had emphasised in a remarkable manner the necessity of filtration being carried out in an intelligent, systematic, and scientific manner.

Mr. Swindlehurst was thanked for his address.

Afterwards Professor S. Delépine, of Owens College, read a paper on "Protection of

Gathering Grounds and Filtration Compared." He reviewed in detail the evidence in support of both methods, and arrived at the following conclusions:—That filtration of unpolluted water is unnecessary as a protection against disease, and in the case of polluted water is not always an absolute safeguard. To make filtration efficient, both constant skilled supervision and considerable expenditure are necessary. Protection against pollution is a sufficient safeguard against disease, and the initial expenditure is not usually very large. The supervision of depopulated gathering grounds requires no special skill or large permanent expenditure. "When expense is not a matter for consideration, the best results are obtained by a combination of protection with well-conducted filtration; but whenever expenditure makes it a matter of necessity to choose between filtration and protection, I have no hesitation in saying that protection is better than filtration, which is really equivalent to saying that prevention is better than cure."

In the discussion which followed, several members argued in favour of filtration as against the acquisition and protection of watersheds.

On the 23rd ult., in a paper on "The Internal Combustion Engine as a Pumping Medium," Mr. D. Hastings Irwin stated that the combined efficiency of the steam-engine and boiler could only under the most favourable conditions be put at 14 per cent., whereas the internal combustion engine could boast of 30 per cent. That was a saving which would be a leading factor in estimating the expense of a projected water supply.

Mr. C. C. Smith (Wakefield) described a new scraping machine, the invention of a German named Nowotry. Mr. Smith had experimented with the machine on a main 5 in. in diameter, the effective diameter of which had been reduced to 3 in. by incrustation. The cost of scraping the main, including labour and materials, amounted to 10d. per lineal yard, exclusive of the royalty on the scraper and the wages of the man working it. The cost of labour and materials was high, but there was no doubt that, with the experience already gained, the cost of those two items could be reduced to 6d. per lineal yard.

A vote of thanks was accorded the Mayor and Corporation of Bolton on the motion of Mr. Watts (Sheffield), seconded by Mr. Millhouse (Scarborough).

In the afternoon the members visited the Bolton waterworks.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, Lord Monkswell, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend Camberwell Borough Council 1,050*l.* for purchase of land, 10,000*l.* for paving works, and 6 88 *l.* for furnishing new infirmary; Poplar Borough Council, 3,345*l.* for electric lighting; Battersea Borough Council, 15,000*l.* for the erection of working-class dwellings; Stepney Borough Council, 7,000*l.* for dwellings; Shoreditch Borough Council, 1,292*l.* for various purposes and 480*l.* for dust destructor; School Board for London, 200,000*l.* for new schools, &c.; and Wandsworth Borough Council, 10,642*l.* for street improvements. Sanction was also given to the following loans:—Hampstead Borough Council, 1,273*l.* for street lighting; and Camberwell Borough Council, 14 500*l.* for purchase of land for wharf.

Chief Officer of the Fire Brigade.—After a long discussion, Captain J. de Courcy Hamilton, R.N., was appointed Chief Officer of the Fire Brigade.

Quantity Surveyors.—The following recommendations of the General Purposes Committee were agreed to:—

"(*a*) That the following be substituted for the first paragraph of standing order No. 216, relating to bills of quantities for architectural works:—

A quantity surveyor is to be employed by the Council to prepare bills of quantities for complicated or large works, the surveyor employed being responsible in all cases for the accuracy of the quantities, *bona fide* clerical errors excepted. Provided that the Committee concerned may in any particular case order the quantities to be prepared by the Architect's staff instead of by an outside quantity surveyor.

(*b*) That the Solicitor be instructed to obtain the execution of agreements as now settled with the following firms of quantity surveyors for architectural works, viz.:—

Mr. C. W. Brooks, Moorgate Station Buildings, 63, Finsbury-pavement, E.C.

Messrs. Franklin & Andrews, 25, Ludgate-hill, E.C.

Messrs. J. R. Hunt & Co., Bridge House, 181, Queen Victoria-street, E.C.

Messrs. J. Leaning & Sons, 28, John-street, Bedford-row, W.C.

Messrs. C. John Mann & Son, 29, Great George-street, S.W.

Messrs. Northcroft, Son, & Nicholson, 9, Regent-street, S.W.

And that the seal of the Council be affixed to such agreements when ready.

(*c*) That so much of the resolution of the Council of April 3, 1900, as relates to the appointment of Mr. W. H. Strudwick be rescinded.

(*d*) That the name of Messrs. Tucker & Huntley, of 22, Buckingham-street, Strand, W.C., be added to the list of quantity surveyors to be employed for architectural works.

That the following be added to the list of quantity surveyors employed in connexion with engineering works:—

Messrs. J. Rider Hunt & Co., Bridge House, 181, Queen Victoria-street, E.C.

Mr. C. E. Bruges, 1, Victoria-street West, S.W."

Investigations of Subjects of General Importance.—They also recommended as follows, the recommendation being agreed to:—

"That the resolution of the Council of June 23, 1903, with regard to scientific investigations relating to the public health be not acted upon, but that applications be made in the next session of Parliament to amend Section 12 of the London County Council (General Powers) Act, 1893, so as to enable the Council to expend 2,000*l.* instead of 1,000*l.* a year in investigating subjects of general importance to the inhabitants of the county."

Trees in Public Streets.—It was agreed to make application in the next session of Parliament for power to enable Metropolitan Borough Councils to plant and maintain trees in the public streets.

Additional Land, Barking Outfall.—The following recommendation of the Main Drainage Committee was agreed to:—"That the estimate of 35,000*l.* submitted by the Finance Committee in respect of the cost of acquiring additional land adjacent to the Barking Outfall be approved."

Number, class, and type of cottages.	Number of persons provided for.	Size of Parlour.	Living room.	First bedroom.	Second bedroom.	Third bedroom.	Scullery.	Bathroom.
		sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.
6 1st class, type A ...	60	101	144	116	96	96	27	22
6 " " B ...	48	114	144	123	96	—	32	20
6 " " C ...	48	96	144	116	96	—	32	20
3 " " D ...	30	96	144	116	100	96	18	—
3 " " E ...	24	96	144	116	96	—	18	—
18 2nd class, type A ...	180	96	144	100	108	96	30	—
10 " " B ...	80	—	144	96	96	96	64	—
10 " " C ...	60	—	144	96	96	—	64	—
27 " " D ...	216	—	144	96	104	96	36	—
27 " " E ...	216	—	144	104	100	96	36	—
6 3rd class, type A ...	36	—	144	96	96	—	30	—
24 " " B ...	144	—	144	96	96	—	30	—
146	1,142							

Rebuilding of Lambeth Bridge.—The Bridges Committee recommended that Parliamentary powers be sought in the next session of Parliament to enable the Council to rebuild Lambeth Bridge at a cost of 872,000*l.*

Lord Welby, on behalf of the Finance Committee, moved as an amendment, "That, having regard to the present commitments of the Council on capital account, the consideration of the question of seeking powers to rebuild Lambeth Bridge be postponed."

After discussion, Mr. McKinnon Wood moved the adjournment of the debate, and this was carried.

Rotherhithe Tunnel Construction.—The same Committee recommended that the estimate of £1,340,000 submitted by the Finance Committee for the construction of Rotherhithe Tunnel be approved, but a motion to adjourn the consideration of the matter was carried.

Housing.—The Housing of the Working Classes Committee reported as follows:—

"On October 22, 1901, the Council entrusted to Messrs. C. B. Roberts & Co. the work of building 276 cottages on Section A of the Totterdown Fields Estate, Tooting. During the building of these cottages it has been necessary to omit from Messrs. Roberts's contract three rows of cottages—one in consequence of permission having been granted to Messrs. Roberts to provide workshops and mills for the manufacture of joinery on the estate, one in consequence of delay in obtaining the extinction of a right of way which crosses the site thereof, and one in order to provide a site for the erection of administrative buildings on the estate. In lieu of these three rows of cottages we propose that Messrs. Roberts should build two rows of first-class cottages in Lessingham-avenue on Section B of the estate. The two rows in question comprise twenty first-class cottages, each containing living-room, parlour, scullery, and three bedrooms. We have ascertained that Messrs. Roberts are willing to accept the substitution of these cottages at the schedule of prices contained in their contract, with an adjustment for any prices not contained therein. This method of dealing with the matter appears to us to be at once fair to Messrs. Roberts and advantageous to the Council, since it will enable the development of section B of the estate to be begun at once, and will, therefore, minimise the inconvenience caused by the omission of the three rows from section A. The Architect's estimate of the cost of the cottages amounts to 7,803*l.*, made up as follows:—Cost of building, 7,608*l.* 10*s.*; provision for articles purchased direct, 45*l.*; architect's expenses, supervision, quantity surveyors' and other fees and incidentals, 149*l.* 10*s.*"

The Committee recommended accordingly and it was agreed. They also reported as follows:—

"On June 30, 1903, the Council referred to us the following tenders for the erection of 146 cottages on section A of the Norbury estate:—

Haslemere Builders, Ltd	£37,000
Messrs. Martin, Wells, & Co., Ltd.	38,338
Mr. B. E. Nightingale.....	39,835
Messrs. F. & H. F. Higgs	40,074
" Holloway Bros.....	40,432
" C. B. Roberts & Co.....	40,487
" Leslie & Co., Ltd.....	41,402
Mr. H. L. Holloway	41,480
Messrs. F. & T. Thorne.....	43,058
Mr. Ingleton, Herne Bay	45 280

The Architect's estimate comparable with these tenders amounted to 41,200*l.*

We now submit working drawings, specification bills of quantities, and estimate of 30,550*l.* in respect of the erection of these cottages. The following table gives the class and type of cottage proposed, and the amount of accommodation to be provided therein:—

. . . . We recommend—That the tender of the Haslemere Builders, Limited, amounting to 37,000*l.* for the erection of the cottages on Section A of the Norbury estate be accepted. . . ."

This was agreed to. Approval was also given to the expenditure of 40,100*l.* in connexion with the formation of roads and sewers on the Norbury estate.

In another Report the Committee announced a gift of 10,000*l.* from Sir Samuel Montagu for the purpose of cottages at Wood Green. The Committee recommended and it was agreed,

"That the generous offer of Sir Samuel Montagu, Bart., to give to the Council a sum of 10,000*l.* to be used for the purpose of facilitating the provision on a portion of the White Hart-lane estate, Wood Green, of cottages for persons of the working class, primarily for residents of three years' standing in the Whitechapel Division of the Tower Hamlets, in accordance with the scheme now submitted in that behalf, be accepted with thanks."

The following recommendations were also passed:—

"That the estimate of 2,900*l.*, submitted by the Finance Committee, be approved; that expenditure up to the amount of the estimate be sanctioned in connexion with the erection and equipment of laundry and the erection of a store at Mill-lane

House, Deptford; and that the Housing of the Working Classes Committee be authorised to make the necessary arrangements for the works to be proceeded with at once.

That the estimate of 14,982*l.* submitted by the Finance Committee, be approved; that expenditure up to the amount of the estimate be sanctioned in connexion with the erection of Brightlingsea-buildings, Ropemaker's Fields site, Wapping, for the accommodation of persons to be displaced by the construction of the Rotherhithe Tunnel; that the work of erecting the buildings be carried out by the Council without the intervention of a contractor; and that the working drawings, specification, bills of quantities, and architect's estimate of 13,892*l.* in respect of the buildings be referred to the Works Committee for that purpose."

The Committee's Report contained the following paragraphs:—

"On July 14, 1903, the Council referred to us the following tenders for the erection of Drake, Raleigh, and Benbow Buildings, Hughes Fields, Deptford:—

	£
Messrs. Martin, Wells, & Co., Ltd.	23,333
Messrs. Leslie & Co., Ltd.	24,631
Messrs. H. Wall & Co.	24,635
Mr. H. L. Holloway	24,730
Messrs. Holloway Bros. (London), Ltd.	24,925
Messrs. Fred & T. Thorne	25,250
The Haslemere Builders, Ltd.	25,588
Messrs. Stimpson & Co.	25,700
Mr. B. E. Nightingale	26,148
Messrs. W. Smith & Son	26,630
Mr. H. F. Lovatt	28,300

The Architect's estimate comparable with these tenders amounts to 25,300*l.*

We now submit working drawings, specification, bills of quantities, and estimate in respect of the dwellings. . . . . The blocks of dwellings now in question are to be erected on three of the four plots of surplus land acquired under the Hughes Fields scheme, Deptford, and will provide accommodation for 660 persons in eight tenements of four rooms, seventy-four tenements of three rooms, and thirty-eight tenements of two rooms. Drake-buildings will provide accommodation for 220 persons, and these buildings will be built on land which, on February 10, 1903, was appropriated by the Council for the provision of accommodation for the 214 persons to be displaced by the erection of the Greenwich electricity generating-station. Raleigh and Benbow buildings will be built on the remainder of the three plots of surplus land, and must be erected under the powers of Part III. of the Housing of the Working Classes Act, 1890. . . . . We recommend . . . . that the estimate of 24,579*l.* submitted by the Finance Committee be approved; that expenditure up to the amount of the estimate be sanctioned in connexion with the erection of Drake, Raleigh, and Benbow buildings, Hughes Fields, Deptford; and that, subject to the consent of the Local Government Board, the sites of Raleigh and Benbow buildings be appropriated for the purposes of Part III. of the Housing of the Working Classes Act, 1890.

That the reduced tender of Messrs. Martin, Wells, & Co., Ltd., amounting to 23,119*l.*, for the erection of Drake, Raleigh, and Benbow buildings be accepted. . . . ."

The recommendations were passed.

"The Council has before it a recommendation that the work of erecting twenty first-class cottages in Lessingham-avenue, on Section B of the Totterdown-fields estate should be entrusted to Messrs. C. B. Roberts & Co. [see above.] We have now had prepared plans of the remaining 414 cottages to be erected on Section B, and in the preparation of these plans we have taken advantage of the resolution of the Council of June 30, 1903, permitting us to design cottages with rooms of such a size and so arranged as to best suit the convenience and comfort of prospective tenants. We are giving careful consideration to the question of the number of persons for whom these cottages should be held to provide accommodation and will report thereon in due course. The cottages will consist of three classes, of which the following table gives particulars:—

Number, class, and type of cottages.	Size of Parlour.	Living room.	First bedroom.	Second bedroom.	Third bedroom.	Scullery.	Bath-room.	Kitchen.
	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.	sq. ft.
24 1st class, type A ...	107	150	140	100	97	33	—	—
28 " " B ...	98	150	130	100	97	33	—	—
14 " " C ...	—	155	113	106	97	53	37	102
48 2nd class, types A, B, and C	—	140	121	97	46	89		—
48 2nd class, types D & G	*91 & 75†	136	*131 & 115†	93	—	35	—	—
13 " type E ...	78	145	123	137	—	37	—	—
48 " " F ...	*91 & 75†	136	*131 & 115†	93	94	35	—	—
116 3rd class, types A, B, and D	—	136	97	90	—	40	—	—
75 3rd class, types C, E, F, and G	—	137	110	96	—	40	—	—

* With bay. † Without bay.

The cottages will be distributed on the estate as follows:

Derinton-road—97 second-class types, D, E, F and G.

Lessingham-avenue—64 first-class types, A, B, and C.

Cotesford-street (north side)—48 second-class types, A, B, and C.

Cotesford-street (south side)—58 third-class types, E, F, and G.

Cowick road—116 third-class types, A, B, and D.

Franciscan-road (west side)—2 first-class type, C; 12 second-class types, D, F, and G; 17 third-class types, C, E, and G.

We have received an offer from Messrs. C. B. Roberts & Co. to build the whole of these cottages at an all-round reduction of 1½ per cent. on the prices contained in the schedule to their contract for the erection of the cottages on section A. This offer holds good till August 29, 1903, and is made partly in consideration of Messrs. Roberts being allowed to retain their workshops and mills on the estate so as to admit of the joinery being made thereat. The Architect's estimate of the cost of the cottages based on this offer amounts to 120,317*l.*, made up as follows:—Cost of building, 115,857*l.*; provision for articles to be bought direct, 1,105*l.*; architect's expenses, quantity surveyor's, and other charges and incidentals, 3,355*l.* . . . We therefore recommend:— . . . That the estimate of 120,317*l.*, submitted by the Finance Committee, be approved; and that expenditure up to the amount of the estimate be sanctioned in connexion with the erection of 414 cottages on section B of the Totterdown Fields estate. That the offer of Messrs. C. B. Roberts & Co. to build the 414 cottages at a reduction of 1½ per cent. on the prices contained in their contract for the erection of cottages on section A of the estate, be accepted . . ."

The recommendations were agreed to.

Widening of Piccadilly and Sloane-street.—It was recommended by the Improvements Committee that the estimate of 209,500*l.* submitted by the Finance Committee be approved, and that, subject to the Westminster City Council agreeing to contribute one-fifth of the cost, or a sum not exceeding 40,000*l.*, and subject to the P. and R. Syndicate undertaking to give up free of cost to the Council any interests which they may have in the land proposed to be added to the public way, the Improvements Committee be authorised to take all necessary steps to secure the widening of Piccadilly to a minimum width of 80 ft. between Sackville-street and Piccadilly-circus.

Mr. Spokes moved, and Mr. Hardy seconded, the postponement of the Report. This was negatived, and the recommendation was carried on a division by 55 votes to 36.

It was agreed to expend 60,000*l.* in the widening of Sloane-street between Basil-street and Brompton-road, subject to the Chelsea Borough Council contributing 20,000*l.*

Other Improvements.—It was also agreed to expend 6,320*l.* in respect of the widening of the portion of Queen's-road, Peckham, within the Borough of Camberwell, authorised by the London County Council (Tramways and Improvements) Act, 1902, in connexion with the reconstruction of the existing tramway in the thoroughfare.

The following recommendations were agreed to:—

"That, subject to the Councils of the Metropolitan Boroughs of Bethnal Green and Hackney giving any consents necessary under Section 12 of the London County Council (Tramways and Improvements) Act, 1901 to the doubling of the tramway between Whitechapel-road and Clapton-road, and agreeing to contribute between them one-third of the net cost of the necessary street widenings, and subject to one-third of the net cost of the street widenings being charged to the account of the improvement, the remaining third being charged to the tramways account which will also be charged with the whole cost of reconstructing the tramway, application be made to Parliament in the Session of 1904 for powers to widen portions of Cambridge-road, Mare-street and Upper Clapton-road, in general accordance with the plan presented to the Improvements Committee, on July 8, 1903.

That exemption from the operation of the 92nd Section of the Lands Clauses Consolidation Act, 1845, be sought to enable the Council to acquire, where necessary, portions of enclosed gardens and private pavements and strips of open land instead of the Council being compelled to purchase the houses as well, the properties in question being as follows: Private pavement fronting Nos. 29, 31 and 33, Cambridge-road; part of 51a, Mare-street; part of forecourts of Nos. 51, 53, 55, 57, and 59, Mare-street; forecourt and part of No. 61, Mare-street; part of St. John's churchyard (adjoining the old Town Hall); part of road entrance to St. John's rectory; part of forecourt of No. 7, Upper Clapton-road; part of forecourt and buildings, Brooke House private lunatic asylum; private pavement fronting Nos. 33 and 35, Upper Clapton-road; part of nursery ground, No. 35a, Upper Clapton-road; and part of forecourts of Nos. 37, 39, 41, 43, 47, 49, 51, and 53, Upper Clapton-road."

By-laws Relating to Plans of Drains.—The Public Health Committee reported as follows, the recommendations being agreed to:—

"On July 21* the Council made by-laws under Section 2 of the Metropolis Management Acts Amendment (By-laws) Act, 1899, relating to plans of drains. In accordance with the statute, it is necessary that the by-laws should be submitted to, and confirmed at, a subsequent meeting of the Council. We accordingly submit them, and recommend—

(*a*) That the by-laws made by the Council on July 21, 1903, under Section 2 of the Metropolis Management Acts Amendment (By-laws) Act, 1899, in relation to plans of drains, be confirmed; and that copies of the by-laws, as confirmed, be sealed and submitted for the approval of the Local Government Board.

(*b*) That the Clerk of the Council be instructed to take the steps prescribed by the Metropolis Management Act with regard to the printing and publication of the by-laws, and that a sufficient number of copies of the by-laws, when approved by the Local Government Board, be sealed, to enable the Council of each metropolitan borough to have a sealed copy for production in cases of legal proceedings."

Theatres, &c.—The following applications were agreed to:—

Improvement of the Canterbury Music-hall, Westminster Bridge-road (Messrs. Wylson & Long).

Certain alterations at the Criterion Restaurant, Piccadilly (Mr. F. T. Verity for Messrs. Spiers & Pond).

Certain alterations and additions to the Dulwich Constitutional Hall, East Dulwich-grove (Mr. E. J. Wallis for the Club).

Extension of lavatory accommodation at Grosvenor Hall, Buckingham Palace-road (Messrs. Woodrow & Helsdon).

Abolition of the Royal box and institution of seats at the Empress Theatre, London Exhibitions (Mr. A. O. Collard).

Setting back the stage front at the Tivoli Music-hall, Strand (Mr. W. Emden).

Rates of Wages and Hours of Labour.—The following recommendations of the Works Committee were agreed to:—

"That the Council's list of rates of wages and hours of labour be amended, and that the hours of labour for wheelwrights, inserted in the list, be fifty-four a week.

That the Council's list of rates of wages and hours of labour be amended, and that the rate of pay for carmen, inserted in the list, be as follows:—

Employed by the Council—One horse, 28*s.* a week; two horses, 31*s.* a week; overtime, 3*d.* per half hour after 6.30 p.m.

Employed by contractors—One horse, 26*s.* a week; two horses, 28*s.* a week."

District Surveyor, North Chelsea.—The following recommendation of the Building Act Committee was agreed to:—

"That the districts of North and South Chelsea be united as from and including August 1, 1903, and the district so formed be designated Chelsea; and that Mr. T. E. Mundy, the District Surveyor of the present district of South Chelsea, be appointed district surveyor for the district of Chelsea as from and including August 1, 1903, subject to the standing conditions of the Council as to the appointment of District Surveyors, with the exception that he be allowed to retain his appointment as assessor and surveyor to the Westminster Fire Office, and that '68' be substituted for '65' in condition (*f*) as the age at which he may be required to retire."

Letting of Property by Public Auction.—The following recommendations were agreed to—

"(*a*) That the resolution of the Council of July 14, 1903, recommending that the Clarence-street, Rotherhithe, and Tower Bridge re-housing sites be put up for sale by auction, be rescinded, and that in lieu thereof the land be offered upon lease for 999

* See our issue for July 25, p. 109.

years, and that the officers be instructed to amend the conditions so as to give effect to the resolution.

(b) That the commercial land, lots 4, 5, 6, and 7, Holborn to Strand; lot 8, Southampton-row; lots 1-15, Mare-street, Hackney; lots 1, 2, and 3, Long-lane, Borough; and lots 14, 15, 16, and 21, Tower Bridge southern approach, be offered by public auction upon lease for eighty years and otherwise in accordance with conditions approved by the Council, adapted in detail as circumstances necessitate."

Fire Station, Isle of Dogs.—The following recommendation was agreed to:—

"That the estimate of 13,267*l.* submitted by the Finance Committee in respect of the erection of a new fire-station at the Isle of Dogs on the site of the existing station and adjoining ground be approved, and that the Fire Brigade Committee be authorised to have the quantities taken out, and to make the other necessary preliminary arrangements for the erection of the station."

Tramway Subway and Paving Works, Holborn to Strand and Southampton-row.—The following recommendation of the Improvements Committee was agreed to:—

"That, in the event of the Works Committee being prepared to undertake, at the amount of the Engineer's estimate, the construction of the tramway subway and the subway for pipes and wires, and also the execution of the paving, &c., works between Great Queen-street and Holborn, and between Eagle-street and Vernon-place, such works be carried out by the Council without the intervention of a contractor, and that the working drawings, specification, bills of quantities, and estimate be referred to the Works Committee for that purpose; but that in the event of the Works Committee not being prepared to accept the work at the amount of the Engineer's estimate, tenders be invited by advertisement."

Flooded Buildings.—Mr. Squires called attention to the flooding of the houses between Fleet-street and the Embankment, and asked if some discretion could not be left to the officers in charge of the fire stations to assist in pumping out basements.

Mr. E. Smith, Chairman of the Fire Brigade Committee, replied that the Committee would try as far as they could to be neighbourly in the matter, but in the case of such a flood as that which took place on Sunday morning such pumping would have been useless.

The Tramways Manager.—Replying to Mr. Burns, Mr. Benn (Chairman of the Highways Committee) stated that Mr. Alfred Baker, the Tramways Manager, had resigned his position to take over the management of the Birmingham Corporation Tramways. There need be no apprehension as to the successful continuance of the tramways of the Council.

The Council adjourned shortly before nine o'clock till October 6.

Illustrations.

SCULPTURE: "HARMONIES."

THIS sculpture in relief, life size, by M. Raphael C. Peyre, was one of the finest works of sculpture exhibited at the Paris Salon this year, where it occupied a prominent position which showed what was the opinion of the Committee on its merits.

It might be taken as a classical rendering of the sentiment of the lovers in the "Merchant of Venice":

> "Look how the floor of Heaven
> Is thick inlaid with patines of bright gold;
> There's not the smallest orb which thou behold'st,
> But in his motion like an angel sings,
> Still quiring to the young-eyed cherubim;
> Such Harmony is in immortal souls."

The upward gaze of the man evidently suggests some such dual meaning to the title "Harmonies."

SKETCHES IN WORCESTERSHIRE.

THESE sketches, like those given last week, illustrate places visited by the members of the Architectural Association on their annual excursion last week, the concluded report of which will be found on another page.

They are made specially for the occasion by Mr. W. Curtis Green.

HOUSE AT SHEPHERD'S GREEN, CHISLEHURST.

SINCE making these drawings, certain alterations have been made affecting the plan internally, but not the exterior.

The object of breaking the house across the centre was to vary the aspect of the different rooms, and to get as little exposure to the north as possible; this arrangement created convenient positions for the entrance and main staircase. The house is built of stock brick, covered with cement rough cast, and roofed with sand-faced roofing tiles. The window casements are of iron with leaded glazing, and not of wood as shown on the drawing.

Messrs. Podger & Sons, of Bromley, are the builders.

HOUSE AT GREAT SHELFORD, NEAR CAMBRIDGE.

THE motive governing the plan of this house was the 3-sided verandah forming part of the house on the southerly side, but not overlooked by any of the sitting rooms. The house is in an exposed position and is kept low for that reason.

It is being built of Fletton bricks covered with rough cast and a red tile roof.

Mr. F. Johnson, of Chelmsford, is the builder, and Mr. W. Curtis Green and Mr. Arch. C. Dickie are the architects for this and the Chislehurst house described above.

THE INSTITUTE OF SANITARY ENGINEERS.

WE mentioned in our last issue that the Institute of Sanitary Engineers held a three days' provincial summer meeting at Wolverhampton recently. The proceedings opened on the 14th ult., when Mr. W. J. Dibdin, of London, delivered a Presidential address, which was briefly summarised in our last issue. On the following day Mr. G. Green, A.M.Inst.C.E., Borough Engineer, Wolverhampton, read a paper on "Cold Storage," and on the 16th ult. the following paper by Dr. J. C. Thresh and Mr. Martin Priest was read on

The Distribution of Sewage on Bacteria Beds.

"It is now generally admitted that in the processes of sewage purification bacterial action is the most important factor with which we have to deal, and that the condition and quality of a sewage effluent will vary according to the different bacterial influences to which the sewage has been subjected. We may, from the point of view of sewage purification, consider bacteria as divided into two classes, viz., anaërobes and aërobes, the anaërobes producing, of course, putrefactive fermentation, while the aërobes produce the true purification, and it is these latter, namely, the aërobic bacteria, that we must chiefly endeavour to cultivate and employ in our sewage schemes; for while the advantage, and even the advisability, of a preliminary anaërobic action on the sewage is becoming a matter of doubt, we find the necessity of the most perfect aërobic action is becoming more and more strenuously insisted upon by those who are making independent investigations into the practice of modern sewage disposal and treatment.

In sewage we find a heterogeneous collection of bacteria and of other micro-organisms. These vary from the bacilli of typhoid fever, cholera, and tuberculosis to the harmless saphrophyte, and from the amœba to the higher types of infusoria and rotifers.

The problem which confronts the sewage expert is how to utilise such a living admixture so as to produce a result which shall be satisfactory, reliable, and easily controlled. It is just as if a farmer were given a quantity of mixed seed, cereals, vegetables, grasses, flowers, weeds, and so on, and told to produce a profitable crop from the mixture.

In the bacterial process of sewage purification we achieve the desired results by a process of selective growths, that is to say, we cause the sewage to pass through the beds under conditions which shall be suitable only for the growth of the particular type of bacteria that will give us the results we desire. But we must take care that the processes producing these conditions are sufficiently under our control to be reliable, otherwise we may find that the results are very different from those which we expect. Now, if bacterial treatment is the main factor in sewage purification, the proper utilisation of the bacteria beds is the crux of the whole problem, and we propose, therefore, to proceed at once to the discussion of the best means for the distribution of sewage on bacteria beds. Of these we may say there are three methods now in use:—

First, the so-called contact beds, in which the beds are filled with sewage, allowed to stand a certain time, then run off and the bed allowed to aërate. Secondly, distribution by means of alternating siphons, with or without arrangements for distributing the sewage over the whole surface of the beds; and thirdly, the continuous or sprinkler system.

It is not necessary for us to dwell on the question of the preliminary treatment of the sewage previous to filtration beyond saying that while in the case of contact beds the use of large depositing tanks may be advantageous, they seem to be unnecessary with the continuous filtration beds, as shown by the successful employment of merely finely-strained sewage at Leeds, and of sewage after simply passing through a small catch-pit at the trial installations at Redhill and Reigate.

The avoidance of preliminary treatment in large tanks is undoubtedly an advantage, not only on the score of economy, but also because strong sewage, after undergoing anaërobic tank treatment, is liable to produce putrefactive and evil-smelling gases, which, if the tanks are closed, may become dangerously explosive, as has recently happened at Walton-on-the-Naze and Sheringham. All that seems absolutely necessary in any process, but more especially in preliminary treatment with sprinklers or continuous filtration beds, is to prevent the larger and grosser solids passing on to the beds, these solids comprising rags, offal, large fæcal matter, pieces of fat, paper wood, and such like; also grit and insoluble mineral matters that become washed into the sewers in time of storms. These substances may be removed by straining or by a comparatively short deposition in detritus tanks, or by a combination of both.

During the last few years we have seen many installations on the contact system which for some reason have not given, and are not giving, very satisfactory results. Some of these have been well-planned, and are carefully tended. Some have secondary contact beds; nevertheless, the ultimate effluent contains much free ammonia and little free oxygen—in other words, nitrification is far from complete. From certain works we have examined samples weekly, or at definite intervals, and have had the samples taken so as to represent as accurately as possible the whole days' flow, so that our experience is based on hundreds of analyses, and observations on works in many parts of the country. We have also examined effluents from works where the sewage is distributed on the beds at regular and frequent intervals by means of automatic siphons, and the results have not nearly answered our expectations. On the other hand, we have examined many samples from beds on which the sewage is distributed at regular and very frequent intervals by means of various forms of sprinklers or sprays, in some cases fixed, in others stationary, and we are compelled to acknowledge that the effluents from beds so used were uniformly of a much higher degree of purity and better oxygenated than effluents from contact beds. We also know that other competent observers are conducting experiments which show the same results.

The mode of applying the sewage is, as we have intimated before, the main factor in relation to the quality of the effluent. The beds may be the same, yet if the sewage is applied in one way the effluent will be far less pure than if applied in another, equal quantities of sewage being treated in twenty-four hours.

It will be interesting to consider what are the main differences between the operations of a sprinkler bed and a contact bed, and to what causes the superior results which we have obtained with the sprinkler beds are due. In our opinion the secret lies in the greater suitability of the sprinkler bed process in fostering the selected growth of bacteria and the superior aëration which the sewage undergoes. The settled sewage which is to be treated is aërated by the sprinkling and comes in contact with the top of the bed, where the aëration is probably greatest. At a distance of, say, 1 ft. down the sewage is in a different chemical condition than when it flowed on to the top of the bed, oxidisation having commenced and sedimentary matter having been arrested. At a depth of 2 ft. in its passage through the bed the sewage has still further advanced in its progress towards purification, and so on. It is only the top of the bed that ever receives unchanged sewage, and the middle and lower parts of the bed never receive wholly unchanged sewage.

are filled with sewage, allowed to
ertain time, then run off and the bed
to aërate. Secondly, distribution by
alternating siphons, with or without
nents for distributing the sewage over
e surface of the beds; and thirdly, the
us or sprinkler system.

ot necessary for us to dwell on the
of the preliminary treatment of the
previous to filtration beyond saying
le in the case of contact beds the use
depositing tanks may be advantageous,
m to be unnecessary with the con-
filtration beds, as shown by the suc-
employment of merely finely-strained
at Leeds, and of sewage after simply
through a small catch-pit at the trial
ons at Redhill and Reigate.

voidance of preliminary treatment in
nks is undoubtedly an advantage, not
the score of economy, but also because
sewage, after undergoing anaërobic
atment, is liable to produce putrefactive
-smelling gases, which, if the tanks are
nay become dangerously explosive, as
ently happened at Walton-on-the-Naze
eringham. All that seems absolutely
y in any process, but more especially
minary treatment with sprinklers or
ous filtration beds, is to prevent the
and grosser solids passing on to the
ese solids comprising rags, offal, large
natter, pieces of fat, paper wood, and
e; also grit and insoluble mineral
that become washed into the sewers in
storms. These substances may be
l by straining or by a comparatively
eposition in detritus tanks, or by a
ation of both.

g the last few years we have seen
installations on the contact system
or some reason have not given, and are
ng, very satisfactory results. Some of
ave been well-planned, and are care-
nded. Some have secondary contact
evertheless, the ultimate effluent con-
much free ammonia and little free
—in other words, nitrification is far
mplete. From certain works we have
ed samples weekly, or at definite inter-
d have had the samples taken so as to
nt as accurately as possible the whole
ow, so that our experience is based on
ls of analyses, and observations on
n many parts of the country. We have
mined effluents from works where the
is distributed on the beds at regular and
t intervals by means of automatic
, and the results have not nearly
ed our expectations. On the other
we have examined many samples
beds on which the sewage is dis-
at regular and very frequent
s by means of various forms of
ers or sprays, in some cases fixed, in
stationary, and we are compelled to
ledge that the effluents from beds so
ere uniformly of a much higher degree
y and better oxygenated than effluents
ntact beds. We also know that other
ent observers are conducting experi-
which show the same results.

mode of applying the sewage is, as we
timated before, the main factor in rela-
the quality of the effluent. The beds
the same, yet if the sewage is applied
way the effluent will be far less pure
applied in another, equal quantities of
being treated in twenty-four hours.

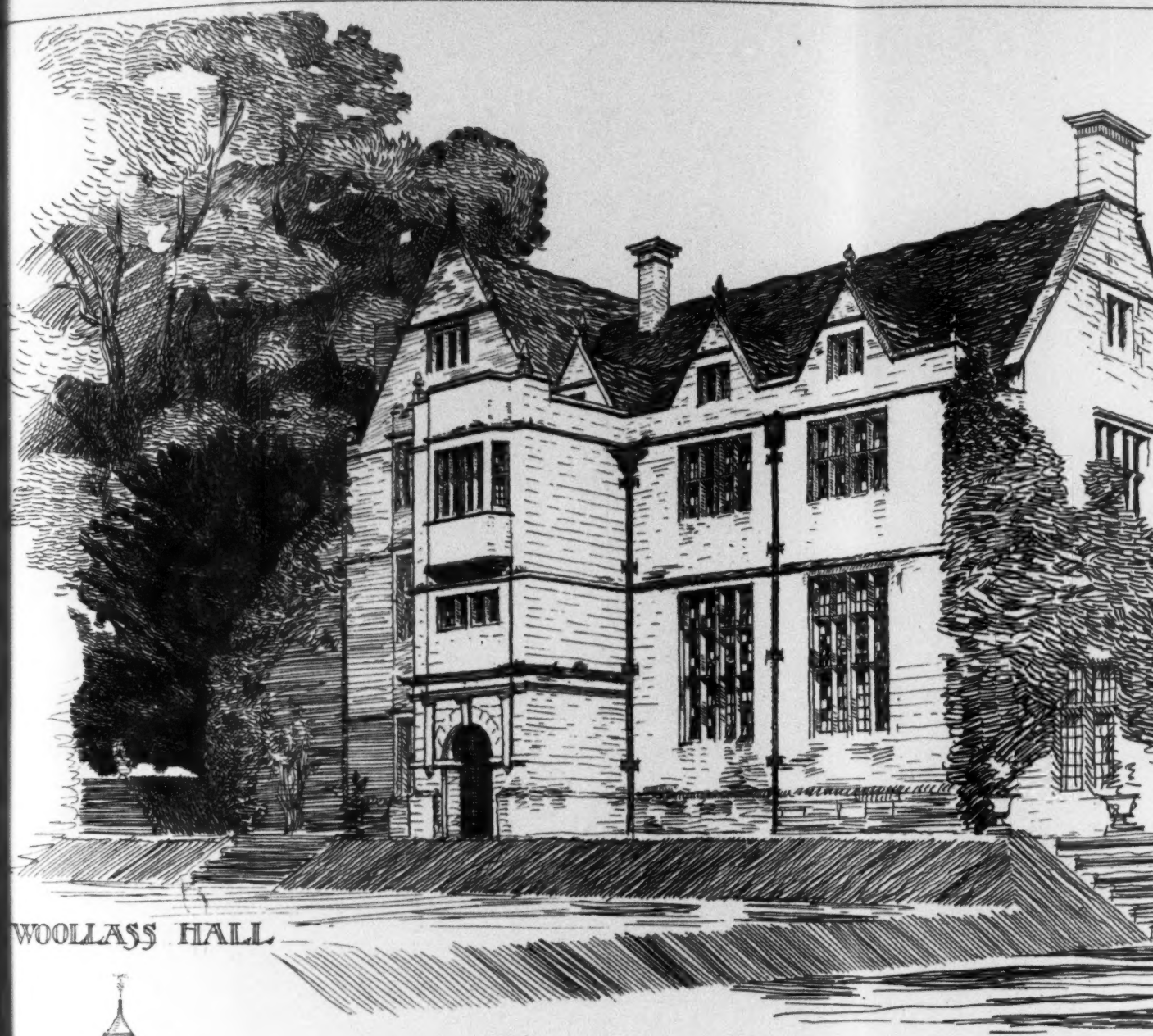
ll be interesting to consider what are
in differences between the operations
rinkler bed and a contact bed, and to
uses the superior results which we have
d with the sprinkler beds are due. In
nion the secret lies in the greater
ty of the sprinkler bed process in
g the selected growth of bacteria and
erior aëration which the sewage under-
The settled sewage which is to be
is aërated by the sprinkling and
in contact with the top of the
ere the aëration is probably greatest.
distance of, say, 1 ft. down the
is in a different chemical condition
en it flowed on to the top of the bed,
ion having commenced and sedimentary
having been arrested. At a depth of
ts passage through the bed the sewage
ll further advanced in its progress
purification, and so on. It is only the
he bed that ever receives unchanged
and the middle and lower parts of the
ver receive wholly unchanged sewage,

SCULPTURE: "HARMONIES."—By

(Exhibited at the Pari

"INK-PHOTO," SPRAGUE & Co. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

IES."—By M. Raphael C. Peyre.
at the Paris Salon.)

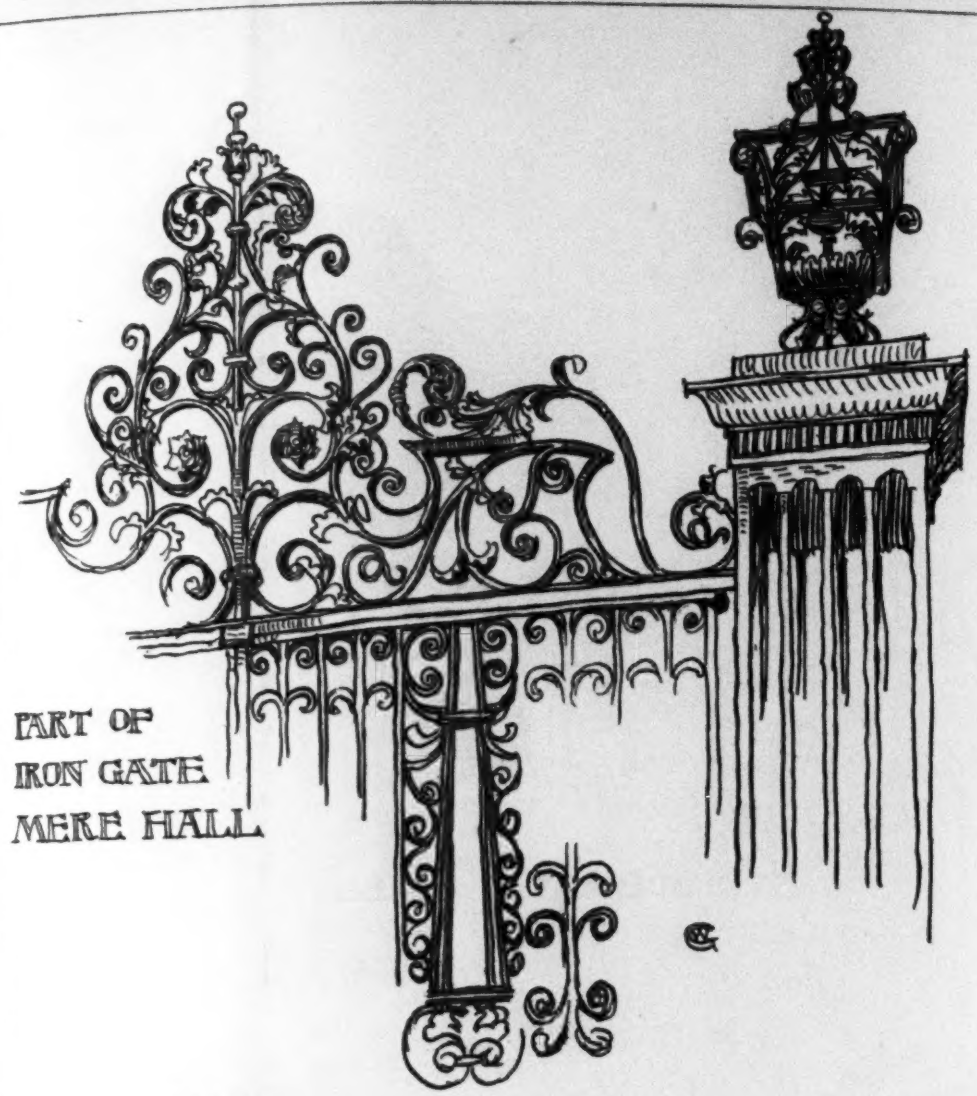


WOOLLASS HALL

AT BIRTSMORTON COURT

WESTWOOD HOUSE

PHOTO-LITHO. SPRAGUE & Co. LTD. 4 & 5. EAST HARDING STREET. FETTER LANE. E.C.



PART OF
IRON GATE
MERE HALL

CHADI

EASTINGTON
HALL

CHADDESLEY CORBETT

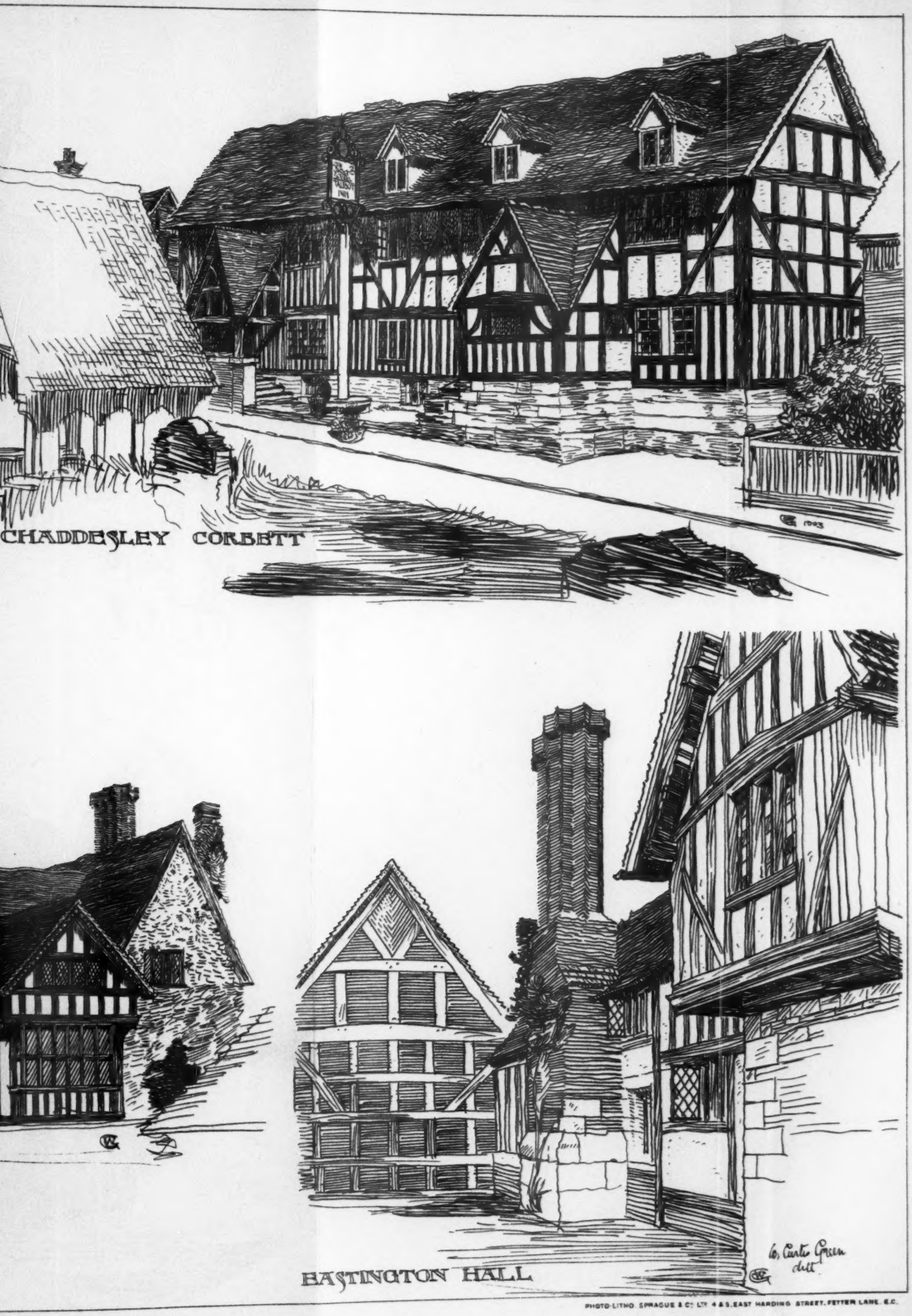
HASTINGTON HALL.

PHOTO-LITHO. SPRAGUE & Co. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

PART OF
IRON GATE
MERE HALL.

CHADI

EASTINGTON
HALL

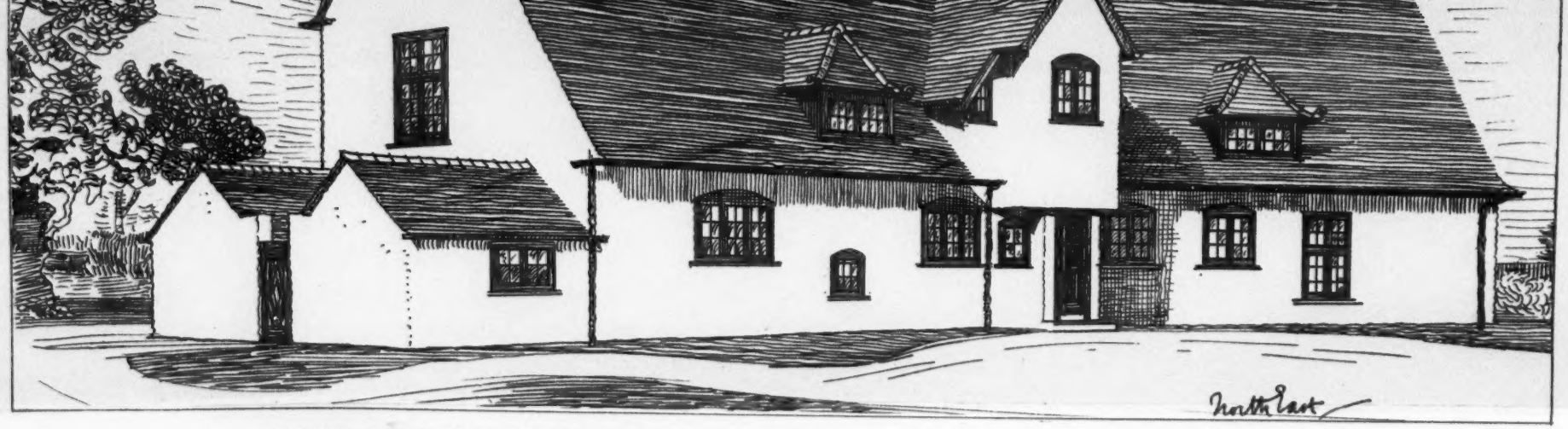


CHADDESLEY CORBETT

EASTINGTON HALL.

PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

W. Curtis Green
1W. et del. 03. South west view



HOUSE AT SHEPHERD'S GREEN, CHISLEHURST.—Messrs. W. Curtis Green & A. C. Dickie, Architects.

PHOTO-LITHO. SPRAGUE & Co. LTD. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

HOUSE AT GREAT SHELFORD, NEAR CAMBRIDGE.—Messrs. W. Curtis Green & A. C. Dickie, Architects.

and the amount of filtration and oxidation that the sewage has undergone by the time it reaches any particular layer in the bed, being constant, the maximum amount of selective growths for dealing with the sewage at those particular points is obtained. For instance, at the top of the bed which receives the settled sewage we found at Redhill large numbers of little worms and the larvæ of flies. These were undoubtedly feeding on the small particles of solid matter in the sewage, but at the bottom of the bed we found none of those, but plenty of nitrifying bacteria, together with infusoria, &c.

Now with a contact bed it may be that these selective growths or cultivations are not obtained in so perfect a manner, because the unfiltered settled sewage comes more in contact with the whole of the body of the bed, the bottom as well as the top, and the purification has to take place through the whole of the bed as best it can, and then, after a rest for aëration, the bed is again flooded with sewage.

Again, as regards aëration we think the contact bed compares very unfavourably with the sprinkler bed, because while the contact bed is alternately filled and emptied, that is to say, first favouring anaërobic, and then aërobic organisms, the continuous or sprinkler bed works under constant aërobic conditions, with always an ample supply of oxygen—oxygen dissolved in the sewage and oxygen in the air carried down by the sewage as it passes through the bed.

We do not think it desirable or even necessary for the purpose of raising a discussion to give long series of analyses, but we give three following typical analyses :—

No. 1.—Best Results Obtained from a Septic Tank and Single Contact Bed Installation, which has been working about one year.

Suspended matter removed	85	per cent.
Free ammonia removed	72	"
Organic matter removed—		
Measured by organic ammonia.....	75	"
Measured by oxygen absorbed	70	"
Nitrification	Slight.	

No. 2.—Best results obtained with a detritus tank, or open septic tank, and primary and secondary contact beds, at work over six months :—

Suspended matter removed	95·5	per cent.
Free ammonia removed	75	"
Organic matter removed—		
Measured by organic ammonia	95	"
Measured by oxygen absorbed	90	"
Nitrification	Fairly good.	

No. 3.—Average Results Obtained with Primary and Secondary Coke Beds fed by Sprinklers.

Suspended matter removed	95	per cent.
Free ammonia removed	99·5	"
Organic matter removed—		
Measured by organic ammonia.....	95	"
Measured by oxygen absorbed	91	"
Nitrification	Practically complete.	

Impurities Removed per Cent.

	No. 1.	No. 2.	No. 3.
Suspended matter	85	95·5	95
Free ammonia	72	75	99·5
Organic ammonia	72·5	93	93
Nitrification	Slight	Marked	Practically complete.

It will be seen that No. 3 has given much better results than we have ever obtained from Nos. 1 and 2. The subject is one of such great importance to everyone interested in the disposal of sewage that no excuse is necessary for presenting this brief paper for the purpose of introducing a discussion. We may, however, be permitted to make a further remark with reference to sewage purification, and which has reference to a subject which must sooner or later come prominently forward, namely, the fact that the bacterial system of purification merely improves the sewage from the chemical point of view, leaving it nearly as impure as before from the bacteriological point of view, and possibly, therefore, quite as dangerous, so far as disseminating the germs of typhoid fever, cholera, and other water-borne diseases is concerned.

Some method is, or will be, required for removing these bacteria. This may possibly be done by a final filtration through beds of sand, but we doubt whether this will prove practicable on a large scale. On the other hand, it may be done by aid of heat, and possibly the heat evolved from the combustion of house refuse may be utilised for this purpose At any rate, it may interest this meeting to know that one of us is experimenting in this direction, and thinks he has succeeded in solving the problem. In any case, such sterilisation is greatly to be desired where the sewage effluent is to be discharged into any stream from which at points lower down water is abstracted for use for domestic purposes, or where the effluent is discharged into tidal water near layings from which shellfish are taken. Possibly some member of the Congress may have given this subject attention, and may have information to impart which will be of interest to the members."

COMPETITIONS.

CARNEGIE FREE LIBRARY, TAUNTON.—There were eighty-one designs submitted in this competition, and these will be on view on Saturday and during next week from twelve till seven, at the Municipal Hall. The assessor, Mr. J. S. Gibson, London, has awarded the premiums as follows :—No. 51, Mr. A. Colbourne Little, 9, Gray's Inn-square, London ; No. 29, Mr. J. Lindsay Grant, 2, St. Peter's-square, Manchester ; No. 42, Mr. Henry A. Crouch, 12, Gray's Inn-square, London.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses :—

Lines of Frontage and Projections.

Brixton.—Blocks of buildings with bay windows and balconies on a site on the north-west side of Coldharbour-lane, Brixton, abutting also upon Lilford-road and Denmark-street (Mr. E. E. Bird for Messrs. L. Whitehead & Co., Ltd.).—Consent.

Strand.—A projecting clock at No. 134, Regent-street (Messrs. J. J. Stockall & Sons, Ltd., for Mr. J. W. Glenny).—Consent.

Hoxton.—An iron and glass shelter in front of the Britannia Theatre, Hoxton-street (Mr. B. Crewe for Mr. T. Barrasford).—Consent.

Hackney, South.†—An addition to the bakehouse at the rear of No. 71, Chatsworth-road, Clapton, to abut upon Blurton-road (Mr. H. Dearsly for Mr. H. Lunken).—Consent.

Islington, East.—Retention of a one-story building on the north side of Northampton Park, Islington, eastward of "Pulbro' Lodge" (Mr. G. H. Lovegrove).—Consent.

Lewisham.—A projecting clock in front of No. 1A, Burnt Ash-road, Lee (Mr. W. F. Young, for Mr. R. Fielding).—Consent.

Bethnal Green, North-East.—A modification of the conditions consenting to the re-erection of buildings on the site of the Arabian Arms public-house, Nos. 222 to 232 (even numbers only), Cambridge-road, and Nos. 2, 4, 6, and 8, Bishop's-road, Bethnal Green, so far as relates to an extension of the time within which No. 2, Bishop's-road was required to be re-erected.—Agreed.

Hackney, Central.—Eight houses on the south side of Richmond-road, Mare-street, Hackney, westward of No. 269, Mare-street (Messrs. Hodson & Whitehead, for Messrs. Hodson & Co.).—Consent.

Hammersmith.—An iron and glass shelter at the entrance in Rockwood-place to the Shepherd's Bush Empire, Shepherd's Bush Green, Hammersmith (Mr. F. Matcham, for the Hackney and Shepherd's Bush Empires, Limited).—Consent.

Hammersmith.†—Buildings on the site of Nos. 91 and 93, Goldhawk-road, Hammersmith, to abut also upon the Grove (Mr. W. G. Hunt for Dr. F. H. Alderson).—Consent.

Fulham.—A projecting clock in front of No. 9, The Broadway, Walham Green, Fulham (Mr. J. Boot for Messrs. Boots, Limited) —Consent.

Kensington, South.—The retention of oriel windows, with projecting pilasters in front of a block of residential flats known as Cecil Court, Hollywood-road, Fulham (Mr. C. J. C. Pawley).—Refused.

Hampstead.—Buildings on a site abutting upon the north side of Abbey-road and east side of West End-lane, Hampstead (Messrs. Goodwyn & Sons for Mr. A. Bretzfelder).—Refused.

Lewisham.—Houses, with bay windows, on the west side of Brockley Rise, Lewisham, southward of Stondon Park (Mr. A. H. Kersey for Mr. R. Kersey).—Refused.

Hampstead.—A one-story stable building at the rear of Belle Vue, Shoot-up-hill, Hampstead, to abut upon Mill-lane (Mr. F. S. Hammond for Mr. De Meza).—Refused.

Islington, South.—One-story shops upon part of the forecourts of Nos. 236, 237, and 238, Upper-street, Islington (Messrs. Drivers, Jonas, & Co., for Mr. C. E. Merson, Mr. R. J. Hayward, and others). Refused.

St. Pancras, West.—The retention of a projecting roof in front of the Mohawk Works, Harmood-street, Chalk Farm, St. Pancras (Mr. F. R. Squire).—Refused.

Width of Way.

Southwark, West.—Offices on the site of No 54, Lant-street, Borough (Messrs. A. C. Potter & Co.) —Consent.

Woolwich.—The erection on the site of Nos. 18, 19, 20, 21, and a portion of the site of No. 22, Lower Market-street, Woolwich, of an extension to the Woolwich Polytechnic Institute (Mr. H. P. Monckton for Lieut. R. L. A. Ogilby, and the governors of the Woolwich Polytechnic Institute). —Consent.

City.—Dwelling-houses and workshops on a site abutting upon the north side of Little Somerset-street and east side of Harrow-alley, Aldgate (Mr. J. R. Moore-Smith for Mr. L. Ceraskin) —Refused.

Width of Way and Line of Frontage.

Hoxton.—A warehouse building on the site of Nos. 2, 4, and 6, East-road, City-road, Hoxton, to abut upon City-road, Brunswick-place, and Catherine-street (Mr. A. Keen for Mr. J. Kent).—Consent.

Fulham.—The rebuilding of the Live and Let Live beerhouse, No. 37, North End-road, Fulham, at less than the prescribed distance from the centre of the roadway of Portland-street (Mr. W. Steward for Messrs. Mann, Crossman, & Paulin, Ltd.).—Consent.

Marylebone, West.—The rebuilding of Nos. 376 to 384 (even numbers) inclusive, Oxford-street (Messrs. A. E. Hughes & Son for Mr. D. C. Apperly).—Refused.

Formation of Streets.

Islington, West.—That an order be issued to Messrs. Boehmer & Gibbs sanctioning the formation or laying out of a new street for carriage traffic, to lead out of the east side of Caledonian-road, Islington, to the north-eastern side of Stock Orchard-crescent (for Mrs. E. J. Cave).—Agreed.

Hackney, North.—That an order be issued to Messrs. Boehmer & Gibbs sanctioning the formation or laying out of new streets for carriage traffic to lead out of the west side of Stamford Hill and south side of Dunsmure-road, Hackney (for Mrs. F. A. Cave).—Agreed.

Cubical Extent.

Deptford.—That the Council do make no order on the application of Mr. J. W. Stevens on behalf of Messrs. Farquharson Brothers & Co., for consent to the covering over of an open space between two buildings at Messrs. Farquharson Brothers & Co.'s works at Rollins-street, Canterbury-road, Deptford. —Agreed.

Width of Way and Cubical Extent.

Woolwich.—The erection at the works of the Western Electric Co., Henley-road, Woolwich, of an addition to a building, with the boundary of the space between such building and addition, and the public way at less than the prescribed distance from the centre of the roadway of Henley-road, and such building and addition exceeding in extent 250,000, but not 450,000, cubic feet, and to be used only in connexion with the manufacture of telephone cables (Messrs. Ardron & Dawson for the Western Electric Co.).—Consent.

Means of Escape at Top of High Buildings.

Kensington, South.—Means of escape in case of fire, proposed to be provided on the sixth floors of blocks Nos. 1, 2, and 3, and on the sixth and seventh floors of block No. 6, Oakwood-court, Addison-road, Kensington, for the persons dwelling or employed therein (Messrs. Rolfe & Matthews for Messrs. Jones Bros.).— Consent.

Kensington, South.—Means of escape in case of fire, proposed to be provided on the sixth and seventh stories of Nos. 63 to 83, Oakwood-court, Addison-road, Kensington (Messrs. Rolfe & Matthews for Messrs. Jones Bros.).—Consent.

*** *The recommendations marked † are contrary to the views of the Local Authorities.*

COURT OF COMMON COUNCIL.

THE usual fortnightly Court of Common Council was held on Thursday last week at the Guildhall.

The Streets' Committee submitted a Report, in the course of which they stated they had further considered the proposed regulations in regard to the demolition of buildings in the City, together with the suggestions of the Royal Institute of British Architects, the Surveyors' Institution, and the Institute of Builders. The Committee submitted a set of by-laws prepared in accordance with Section 5 of the City of London (Public Health) Act, 1902, and recommended that the same be approved of, and be submitted to the Local Government Board for confirmation.

The Report was adopted.

The same Report recommended that at the expiration at Michaelmas next of the contract for the reparation and construction of sewers, the tender of Mr. Alfred Woodhouse be accepted for one year at 10 per cent. above schedule prices ; that creosoted wood blocks be substituted next year for the existing carriageway pavements of Cloak-lane and College

Hill at an estimated cost of 370*l.*; that creosoted deal blocks on a foundation of Portland cement concrete be laid in the upper portion of Laurence Pountney Hill and Suffolk-lane, next year, at an estimated cost of 350*l.*; that the carriageway of Bouverie-street be paved next year, as far as practicable, with hard wood blocks, at an estimated cost of 700*l.*; that the sewer in Eldon-street be reconstructed at a cost of about 2,800*l.*, and that tender for the work be advertised for; that permission be granted for the fixing of an earth plate to the lightning-conductor of St. Stephen's, Walbrook, on the application of Mr. H. Percy Monckton on behalf of the churchwardens; that, subject to the usual conditions the construction of two vaults and the fixing of three pavement lights at No. 1, Cross-lane, Bush-lane, be allowed on the application of Mr. Howell J. Williams; and that permission be given for the construction of a vault at No. 67, Farringdon-street on the application of Mr. T. Walter Mass for Mr. L. Heywood. The recommendations were all agreed to.

METROPOLITAN ASYLUMS BOARD.

THE usual fortnightly meeting of the Metropolitan Asylums Board was held on Saturday last week at the Board's offices, Victoria Embankment, Sir R. Hensley in the chair.

Correspondence was received from the Local Government Board in respect of the following matters:—The proposal to provide twenty-two cottages for married attendants at Leavesden Asylum, returning the amended plan and requesting the Managers to consider certain points with regard to the system of drainage; the proposal to erect a building for housing a steam fire-pump at Caterham Asylum, and stating that the Board had already approved of a plan for the same; and the alterations and additions which are proposed to be carried out at Southfield House, Joyce Green, promising an order authorising the expenditure of a sum not exceeding 485*l.* on such work. The matters were referred to Committee. On the recommendation of the Finance Committee, it was agreed to make application to the Local Government Board for orders authorising the expenditure of the following sums:—8,680*l.* for the erection of additional buildings at Joyce Green Hospital; 2,773*l.* for the erection of new workshops at Darenth Asylum; 797*l.* (additional) for alterations and additions at the Northern Hospital; and 1,070*l.* for the erection of engineers' cottages at the Brook and Grove Hospitals—Brook Hospital, 530*l.*, and Grove Hospital, 540*l.* The Works Committee reported that they had sanctioned an expenditure of 205*l.* 8s. 4d. on granite paving at Banstead-road school. This was an extra on Mr. J. B. Potter's contract of 11,099*l.* The same Committee recommended and it was agreed to apply to the Local Government Board for sanction to the expenditure of an additional sum of 105*l.* in respect of the completion of the boundary wall at the Grove Hospital. With reference to the cottages for married attendants at Leavesden, and the letter received from the Local Government Board, the Committee recommended and it was agreed, that the plan, when amended, be forwarded to the Local Government Board with an estimate of the probable cost. The Works Committee further reported that they had sanctioned various extra works at the Southern Hospital, the value of which amounted to 865*l.* In regard to the same hospital the architect had reported that the sum of 2,400*l.* provided in the contract for extra foundations would probably not be required at all. The offer of the County of Surrey Electrical Power Distribution Co. to supply alternating current at 200 volts to the Southern Hospital at a reduced rate of 2½*d.* per unit was accepted. Messrs. Treadwell & Martin, the architects to the Southern Hospital, were appointed to prepare plans and to supervise the work of forming roads and paths at the hospital. The Hospitals' Committee reported that the Sutton Water Co. had offered to supply water to the Southern Hospital at the rate of 10*d.* per 1,000 gals., provided that the Board agreed to take from the company all the water to be used within the hospital or its grounds. The Committee's recommendation that the offer be accepted was agreed to.

HOUSE-BUILDING IN FROSTY WEATHER.

IN winter time one hears much about the want of employment for bricklayers and others in the United Kingdom on account of frosty weather, yet any one residing in Stockholm during the winter months can see bricklaying carried on in hard frost as an everyday occurrence. Mr. Stewart MacGregor, the present British Consul in Stockholm, was so struck by this circumstance that he made special inquiries as to how the contrast was brought about, in the hope that any information he might obtain on the subject would be useful in England. In the course of his investigations he met Mr. P. Graham, a native of Scotland, long resident in Sweden, who was able to supply him with a detailed explanation which the Consul has now communicated to the British Foreign Office, with the preliminary remark that "the art of building stands very high in Stockholm, much of the work done being both ornamental and of excellent quality."

The substance of Mr. Graham's valuable information on the subject is to the following effect, viz., that a few years ago a series of experiments were carried out in Stockholm with a view to deciding the lowest temperature at which bricklaying might safely be carried on. Three different temperatures were decided on, viz.:—

	Celsius. deg.	Equivalent (about) in Fahr. deg.
First	— 5	23
Second	—10	14
Third	—15	6

The bricks and mortar were, as to quality and conditions, such as are commonly used in Stockholm. The walls thus erected during winter were allowed to stand till the following autumn, when they were torn down and the following results noted: Nos. 1 and 2 were perfectly satisfactory; the mortar was quite hard and sound and had to be scraped from the bricks. No. 3 proved to be unsatisfactory; the mortar did not adhere at all to the bricks, which lay loosely embedded in it. These results, Mr. Graham points out, tend to prove that, without any special precaution as to material or labour, bricklaying can be carried on in Stockholm at a temperature as low as 14 deg. Fahr. For lower temperatures it is necessary to heat the sand and water used in making the mortar, and for this purpose very simple apparatus are employed:—First, for the boiling of the water, all kinds of contrivances are to be seen in use, including primitive as well as modern boilers; second, for heating the sand the common arrangement consists of a circular iron tube 18 in. to 24 in. in diameter, and 6 ft. to 8 ft. long, closed at one end with bricks or an iron plate; on the top at this end there is a chimney 8 ft. to 10 ft. high, and 5 in. to 6 in. in diameter. The fuel, which is generally refuse wood from the building under erection, is fed in at the open or partly open end of the cylinder. This cylinder is often formed of an old boiler tube or a piece of an old iron chimney, &c. For burning coal, special grate and chimney arrangements would be necessary, but in no case need they be elaborate or expensive. After placing the cylinder on the ground the sand is heaped on and around it to a depth of 18 in. to 24 in., and allowed to remain until it gets hot, when it is taken away from where it is hottest and replaced by fresh sand. The mortar should be made in a room where the temperature is kept well above freezing; this temperature should naturally be regulated according to the frost that has to be counteracted. Generally the builders in Stockholm make a room of the kind described by roughly boarding in a part of the scaffolding, simplicity and cheapness being the prominent characteristics of all the arrangements. When building in frosty weather the following precautions should be observed:—(1) In laying the bricks care should be taken to avoid shifting them after they have once been set in the mortar. (2) Never use old or stale mortar, but arrange supply to correspond with demand. (3) It should be understood that the brick used in Stockholm is of a light or porous character, which readily absorbs the moisture from the mortar; hard-pressed or calcined bricks and stonework generally are not suitable for building during frosty weather, but edgings or ornaments, &c., of such material can easily be dealt with by slightly warming them before bringing them into position; this can be done by keeping them a few days in a wooden shed heated by an open coke-stove; in some cases it is found advisable to cover in with rough boarding the part of the wall where such stonework is extensive; in such cases a very small coke fire is found sufficient to keep the temperature high enough to prevent any damage to the mortar. (4) Although brick-building can thus be carried on safely under any of the temperatures already named, this does not apply to plaster or cement work, which should not be done at or below freezing point, unless proper heating arrangements are made. Whereas in Stockholm, fifteen or twenty years ago, almost all building was broken off during four to five months every winter, it is now the exception that such operations are hindered by frost more than a few days, or, at most, a few weeks, annually, and this though there is much more stone and ornamental work in the buildings now being erected than in those of an earlier period. What twenty years ago was considered practically impossible has now become every-day practice. To sum up shortly, the bricks should be porous and perfectly dry, that they may readily absorb the moisture in the water; and, in the second place, the water, sand, and bricks must all be heated.

TOWN'S OFFICES, SHIPLEY, YORKS.—At the monthly meeting of the Shipley District Council, on the 21st ult., the proposed outlay in connexion with the erection of new town's offices was under discussion. Mr. J. W. Moody, Chairman of the Public Offices Committee, proposed the adoption of the minutes of that Committee, from which it appeared that Mr. W. H. Beevers, architect, had submitted plans of baths and workshops at an estimated cost of 4,000*l.*, making a total estimated expenditure for public offices of 24,000*l.* These plans were submitted for confirmation. Mr. R. Lindley seconded the motion, which was agreed to after discussion.

NATIONAL FEDERATION OF BUILDING TRADE EMPLOYERS.

THE annual meetings of the National Federation of Building Trade Employers of Great Britain and Ireland were opened at Cardiff on the 21st ult. The Mayor (Alderman E. Thomas), who wore his official robes, welcomed the members to the town at the library of the South Wales Institute of Engineers, Park-place, where the meetings were held. The President of the Federation (Mr. C. W. Green, of Liverpool) was introduced to his worship by Mr. James Allan, President of the Cardiff Builders' Association, and among those present were Alderman W. H. Jessop (Huddersfield), Mr. Wm. Shepherd (London), Vice-Presidents of the Federation; County Alderman J. Bowen, of Birmingham; Mr. T. F. Rider, London; Alderman W. Holdsworth, Bradford; Messrs. Wm. Sapcote, Birmingham; A. Krauss, Bristol; B. I. Greenwood, London; W. Nicholson, Leeds (Treasurer); G. Macfarlane, Manchester; S. Smelhurst, Oldham, members of the Federation; Aldermen David Jones, J. Ramsdale, and P. W. Carey, and Councillors F. J. Veall, J. Robinson, F. J. Nicholls, A. Sessions, S. O. Williams, and Illtyd Thomas, Cardiff. Mr. Lanchester, representing the architects, and Mr. P. S. King, of King & Son, contractors for the new town hall and law courts, were also present, and were introduced.

The Mayor said he could assure them it was a great pleasure to welcome them in his official capacity to the town of Cardiff. Cardiff was an advancing town, and in bricks and mortar it was making great strides. The number of houses and shops built in the town from 1881 to 1902 was 20,149. There were at present many public works on hand, notably the new town hall and law courts in Cathays Park, the new asylum at Whitchurch, and other large works for private persons and companies. In Cathays Park, too, sites were being given to the University College, the University of Wales, the Central Welsh Board, and other public bodies and institutions.

The President of the Federation (Mr. Green) thanked the Mayor for having received the Federation.

In the afternoon the members were the guests of Mr. James Allan, President of the Cardiff Builders' Association.

The Mayor proposed the health of Mr. Green, and referred to the useful work done in the technical schools in Cardiff. Contracts representing half a million of money were now let in Cardiff.

Mr. Green suitably replied.

Speeches were also delivered by Alderman Ramsdale, Alderman David Jones, and others. Alderman Ramsdale said he believed the tendency of the times was in favour of public bodies letting their work by contract, rather than doing it themselves, but, so far as Cardiff was concerned, he was certain that the ratepayers got value for their money.

In the evening a banquet, presided over by Mr. C. W. Green, was held at the Royal Hotel.

The loyal toasts were submitted from the chair and duly honoured, after which Mr. H. B. Greenwood submitted the toast of "The Imperial and Reserve Forces" to which Mr. J. R. Kempson, Cardiff, responded.

The Mayor of Cardiff next submitted the toast of "The National Federation, and the various Centres and Local Associations." The building trade, he said, was one of the largest industries in the kingdom, which they would easily discern when they came to count all those engaged in it and the capital it involved.

Mr. W. F. King, of the firm of King & Son, responded. He said the Federation had consistently advocated a conciliation board for the settlement of labour disputes, and they had seen the fruits of that policy in the few troubles they had experienced during the last few years.

Mr. W. Sapcope proposed "The South Wales Federation and the Cardiff Master Builders' Association," and said that he was very much struck with the splendid wide streets of the town and the excellent train service they had, and he ventured to say that Cardiff could almost hold its own with many of the principal towns in the United Kingdom.

Messrs. J. Allan, W. Blackburn, and J. Turner responded, the latter stating that since 1892, when they had a prolonged dispute in the town in the building trade, everything had gone on smoothly by reason of an amicable understanding having been come to between the different societies.

Alderman David Jones proposed the health of the Chairman, to which Mr. C. W. Green suitably replied, and after the healths of the Vice-Presidents had been drunk, on the proposition of Mr. J. W. Courtis, and responded to by Alderman Jessop, the proceedings terminated.

The following day, the Council, which met on the previous day, recommended that a reserve fund should be inaugurated by levies or otherwise. An amendment was, however, moved that a reserve fund be formed by donations or otherwise. Eventually it was decided that before any definite decision was arrived at, a committee of the Federation should report on the matter to the emergency committee, and that the question be finally dealt with at the next annual meeting in London.

A resolution moved by Mr. G. Macfarlane, Manchester, to reduce the subscription of members by

1d. on the "1001. in the wages paid" was lost after a rather prolonged discussion.

An important discussion took place upon the relations of builders and plasterers with the National Association of Operative Plasterers. Much friction has existed for some time with regard to the working of an agreement come to in 1899, which the builders and master plasterers claim has been repeatedly broken by the men's union. The payment of local rates of wages by contractors, whose chief offices are situated in other towns, has also apparently reached a stage when something definite in the way of a satisfactory arrangement with the men and employers will have to be arrived at, for the meeting appointed a committee composed of four master builders and four master plasterers (with the President of the National Federation as chairman) to deal with the questions immediately.

A special sub-committee appointed to confer with the Royal Institute of British Architects on the question of the new form of contract, reported that they had succeeded in settling satisfactorily an official form of contract with the Committee of the Royal Institute of British Architects, subject to the approval of the respective councils of the organisations interested. Instead of providing one document to be adopted, either for contracts in which the bills of quantities are excluded, or for contracts in which the bills of quantities are included, they had agreed that a separate and distinct document should be issued in each case, and in the form of contract in which the bills of quantities were included they had obtained the insertion of a new clause, which they considered would effectually secure the contractor against any loss in consequence of any errors which might appear in the bills of quantities. The new clause was as follows:—"Should any error appear in the bills of quantities other than in the contractors' prices and calculations, it shall be rectified, and such rectification shall constitute a variation of contract, and shall be dealt with as hereinafter provided."

The half-yearly Report referred to the Royal Commission appointed to consider the question of municipal trading, and urged upon the different federations to take the matter in hand, with a view of sending up witnesses to oppose the action of municipalities.

In accordance with arrangements kindly made by Mr. J. Hurman, the members in the afternoon visited the docks. They subsequently visited the Dowlais Works.

In the evening the Mayor and Mayoress of Cardiff (Alderman and Mrs. Edward Thomas) invited the members attending the conference to a reception in the Town Hall. The function was well attended. A large party visited Ilfracombe on the following day.

[The above has been taken from the report in the *Western Mail*.]

Correspondence.

SEWAGE DISPOSAL.

SIR,—Your remark on my patent for sewage disposal, shown at the Building Trades' Exhibition recently, that I "put the aërobic filter before the anaërobic" seems to require explanation on my part. I regret the model was covered when your visitor was paid.

The process which I have patented I believe to be according to Nature. I have combined the dry-earth and water-carriage systems as most suited to country houses.

The rain falling on the face of the ground and passing through the foul matter therein, which is changed, or should be, by being buried in cultivated soil, filters downward into the pervious strata beneath charged with oxygen and micro-organisms, till it is stopped by an impervious bed, when it runs often long distances, and to a considerable depth. When further checked it rises by force of the head that feeds it through the overlying pervious strata, and being tapped by deep wells, yields generally a pure and never-failing supply. The solids having been finally disposed of by some bacillus in the foul air beneath, and clarified in the close upper strata through which it has been forced, we have both quality and quantity. This process, of course, can only be carried out in a limited way above ground, but the principle can be followed whereby a pure effluent is obtained, and by repeating the anaërobic filter would give water pure enough for supplying cattle.

I claim by this simple and natural process: (1) that the whole manurial value is preserved; (2) that without chemicals or mechanism, and with a minimum of hand labour—about half-an-hour once a week is sufficient for removing solids—it is continuous and inodorous in working; (3) that I obtain a pure effluent. I may mention that at two large houses where it has been adopted—before it was fully perfected as in the patent—I have obtained most satisfactory results.

ALFRED S. GOODRIDGE.

*** Mr. Goodridge admits the accuracy of our description of his apparatus. With reference to his letter we may say that reasoning from analogy may be misleading, and we should be better able to judge of the merit of his invention if the results of extensive chemical and bacterial analyses had been given.—ED.

The Student's Column.

CONCRETE-STEEL.—V.

THE PHYSICAL PROPERTIES OF STEEL.

FROM the report of the Steel Committee, 1868-70, it is clear that within the yield point of steel the amount of lengthening from tension, or of shortening from compression, produced by equal forces per unit of area, is nearly the same, and further that the stress at which the material yields or breaks down is practically the same for tension and compression. The tests conducted by the Committee were upon bars 1½ in. diameter and 10 ft. in length between the measuring points, and owing to this unusual length the results obtained were particularly accurate. One noteworthy point is the uniformity of behaviour within the elastic limit of all the bars, irrespective of differences in manufacture. Some average values taken from the report of this Committee are recorded for reference in Table XII.

Table XII.—Tension and Compression of Steel Bars.

Type and Mark of Steel.		Tension. Ultimate Stress in lbs. per sq. in.	Tension. Yielding Stress in lbs. per sq. in.	Compression. Yielding Stress in lbs. per sq. in.
Bessemer	"SLW" ...	33,685	17,500	16,000
	"H" ...	34,193	20,000	21,166
	"K" ...	35,403	19,500	18,000
Cast	"31" ...	33,650	26,750	27,000
	"H" ...	41,850	27,000	26,000
	"46" ...	43,480	26,000	25,500
Crucible Cast	"KB"...	34,440	20,500	24,000
	"NB"...	51,013	25,500	26,166
	"SC"...	52,760	26,000	23,333

The tensile strength and elastic limit in tension and compression of low carbon or mild steel, and of high carbon or hard steel, are shownin Table XIII., which is calculated from the results of tests made by Professor Bauschinger at the Ternitz Steel Works.

Table XIII.—Tensile Strength and Elastic Limit of Steel in Tension and in Compression.

Percentage of Carbon.	Ultimate Tensile Strength.	Elastic Limit in Tension.	Elastic Limit in Compression.
	Lbs. per sq. in.	Lbs. per sq. in.	Lbs. per sq. in.
0·14	62,944	41,055	39,536
0·19	68,096	47,084	43,008
0·46	75,712	49,056	48,944
0·51	79,744	48,428	46,233
0·54	79,072	49,616	48,944
0·55	80,416	46,995	49,772
0·57	79,744	47,084	48,943
0·66	89,600	53,244	53,648
0·78	92,064	53,312	53,648
0·80	102,816	57,008	63,168
0·87	104,608	61,017	56,000
0·96	118,048	69,216	71,120

For tension tests, the plates used measured 24 in. long by 2·8 in. wide by 0·48 in. thick, and for compression tests, the specimens measured 3·6 in. long by 1·2 in. square. The percentage of carbon in steel for various purposes is stated below as an index to the percentages of carbon stated in Table XIII. and other tables:—

	Per cent.
Boiler plate	From 0·10 to 0·33
Wire ropes (ordinary) ...	„ 0·15 to 0·30
„ (hard).....	„ 0·45 to 0·75
Structural sections	„ 0·20 to 0·25
Rails	„ 0·30 to 0·60
Tool steel	„ 0·70 to 1·40

The resistance of steel to shearing stress varies somewhat, according to the direction in which force is exerted with respect to the structure developed in rolling the plate or bar. As a general rule, however, it may be taken that the ultimate shearing stress of steel is from 70 to 75 per cent. of the ultimate tensile stress. For mild steel the value is about 50,000 lb., per sq. in., and for hard steel about 80,000 lb. per sq. in.

With regard to the modulus of direct elasticity, it should be noted that, as in the case of concrete, values are calculated by some investigators from the total deformation, and by others from the elastic deformation only.

In Table XIV. are given the values of the modulus according to the two modes of measurement as ascertained by the tests of the Steel Committee. Here, E is the ordinary coefficient, and E_1 is the coefficient calculated after deducting permanent set.

Table XIV.—Modulus of Elasticity of Steel in Tension and Compression at Different Loads.

Stress in lbs. per square inch.	Values of E in 1,000,000-lbs. units.	
Tension.	E per sq. in.	E_1 per sq. in.
15,232	28·7	28·7
17,785	28·6	28·6
20,316	28·6	29·0
22,870	28·9	27·4
25,401	28·6	29·1
27,955	28·5	29·4
30,486	28·2	29·3
38,102	26·6	30·0
Compression.		
23,251	29·7	30·1
31,001	29·5	30·3
34,227	29·2	30·8
36,176	28·9	30·6
38,774	28·0	30·5
41,350	24·0	30·1

Table XV.—Modulus of Elasticity of Steel of Different Kinds.

(Values of E in 1,000,000-lbs. units).

Type of Steel.	E per sq. in.	Percentage of Carbon.	Authority.
Soft cast	30·3	—	Kupffer
Hard file	30·1	—	Kupffer
Hammered Bessemer	30·3	1·15	Knut Styffe
Rolled cast	31·2	1·22	Knut Styffe
Krupp cast	31·3	0·61	Knut Styffe
Rolled puddled	29·9	0·56	Knut Styffe
Siemens-Martin	29·9	—	Bauschinger
Bessemer	32·4	0·19 to 0·96	Bauschinger

Table XV. shows the value of the modulus E for different qualities of steel, and Table XVI. indicates the variation of E, with the percentage of the carbon in the steel, and according to the nature of the test. The latter table is compiled from a series of records given by Professor Bauschinger.

Table XVI.—Modulus of Elasticity of Steel with Different Percentages of Carbon Under Different Tests.

Percentage of Carbon.	Values of E in 1,000,000-lbs. units per square inch. Tension.	Compression.	Bending.	Mean.
0·19	30·8	37·0	29·1	32·9
0·46	32·0	32·7	29·3	31·8
0·54	30·6	36·1	28·8	32·4
0·57	30·7	32·0	29·2	31·0
0·66	32·4	35·7	32·1	33·6
0·78	33·5	32·4	30·1	32·4
0·80	30·5	32·3	32·9	31·7
0·87	31·0	31·5	30·4	31·1
0·96	30·9	32·7	29·2	31·2

From the foregoing tables it will be seen that the mechanical and elastic strength of steel is fairly uniform for the various qualities manufactured, and that the modulus of elasticity is practically constant within the elastic limit. From a consideration of the figures the following average values may be established both for tension and compression:—

	lbs. per sq. in.
Ultimate strength, mild steel	65,000
„ „ medium steel	78,000
„ „ hard steel	100,000
Elastic limit, mild steel	40,000
„ „ medium steel	48,000
„ „ hard steel	58,000
Modulus of elasticity	30,000,000

An important matter in connection with steel incorporated in buildings is the effect of temperature on its strength and ductility. The risk of fire has always to be considered, and it is very necessary for the designer to be able to estimate the probable influence of heat upon

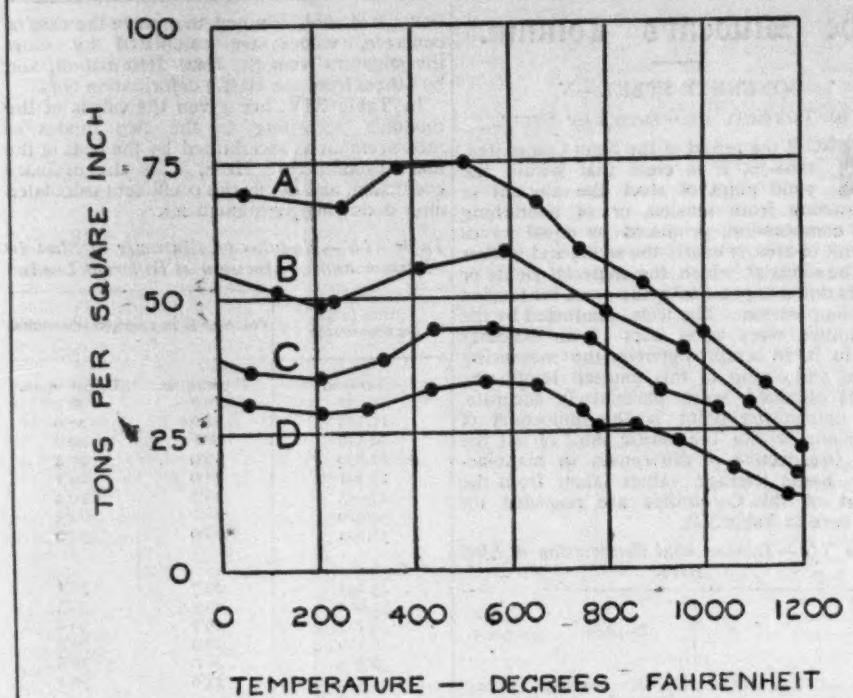


Illustration to Student's Column.

metal however employed. Sir William Fairbairn's tests* upon iron plates and rivet iron showed that the strength of the former was not materially decreased until temperatures of over 1,200 deg. Fahr. were approached, and that the strength of the latter increased from 62,720 lbs. per square inch at 60 deg. to 86,016 lbs. at 435 deg. Fahr., while at 1,290 deg. the strength decreased to 35,840 lbs. per square inch. More precise experiments by Knut Styffe indicate that at temperatures between 212 deg. and 392 deg. Fahr. the strength of steel is practically the same as at normal temperatures. According to the results obtained by Mr. C. Huston† in testing steel at temperatures ranging up to 932 deg. Fahr. there is gain of strength and loss of ductility with increase of temperature. From a table calculated by Roelker‡ we take the following figures relative to Bessemer steel :—

Temperature in Degs. Fahr.

0 100 300 500 700 1,000 1,500 2,000

Percentage of Original Strength.

100 100 100 98·5 68 31 12 5

Some of the most important tests of this nature are those made for the Admiralty by Mr. Barnaby. Table XVII. embodies some of the results quoted by Professor Unwin,§ the tensile strength being reduced to pounds per square inch. The bars were partly heated in oil and partly in sand, temperature being judged by the colour of the metal.

Table XVII.—The Influence of Temperature on the Tensile Strength and Elongation of Steel. (*Elongation in a Length of 8 in.*)

Type of Steel.	Temperature.	Tensile Strength.	Elongation.
	Degs. Fahr.	lbs. per sq. in.	Per centage.
Bessemer	60	58,396	27·34
,,	450	90,720	14·06
,,	520	86,688	17·18
,,	880	53,804	25·56
Bessemer	60	63,817	21·87
,,	430	86,016	18·75
,,	550	74,099	17·18
,,	580	41,574	25·00
Siemens-Martin	60	65,184	25·78
,,	430	74,928	14·06
,,	490	77,280	18·75
,,	610	62,720	18·70
,,	630	69,059	18·74

Other recent tests made by Mr. J. E. Howard at Watertown Arsenal, U.S.A., showed that tensile strength diminished as temperature was increased from 0 deg. to about 250 deg. Fahr.

* Report of the British Association, 1857.
† Proc. Inst. C.E., Vol. liii., p. 304.
‡ Proc. Inst. C.E., Vol. lxvii., p. 437.
§ "The Testing of Materials of Construction," by W. C. Unwin, p. 300.

From the latter point upwards strength increased with the rise of temperature until the maximum was reached between 500 deg. and 600 deg. Fahr. At higher temperatures strength again diminished. Curves are given in Fig. 6, for four bars containing the following percentages of carbon: A, 0.20; B, 0.37; C, 0.57; D, 0.97. Mr. Howard's investigation further showed that the coefficient of elasticity decreased as temperature increased, the decrease depending upon the percentage of carbon in the steel, as indicated in Table XVIII.

Table XVIII.—The Influence of Temperature on the Modulus of Elasticity of Steel. (*Values of E, in* 1,000,000-*lbs. Units.*)

Percent. of Carbon.	Temp. Deg. Fahr.	E. per sq. in.	Temp. Deg. Fah.	E, per sq. in.
0·20	74	29·2	470	26·6
0·37	68	29·7	475	27·5
0·57	80	30·0	465	28·1
0·97	80	29·1	455	27·7

An elaborate report by Professor Martens,* on the influence of heat upon the strength of iron and steel contains a great deal of useful information on this point, but it is only necessary to mention the following facts: Commencing at 4 deg. Fahr., the tensile strength of mild steel diminished with increase of temperature to about 150 deg. Fahr. It then increased with the rise of temperature to about 480 deg., afterwards falling rapidly to about 13,440 lbs. per sq. in. at the temperature of 1,100 deg. Fahr. The yield point was found to fall regularly with the rise of temperature.

The safety of steel structures may sometimes be influenced by the peculiar behaviour observed by Professor Martens in steel at 570 deg. Fahr. At that temperature it appears that the strength of the material is greater, but its ductility is less than when in a cold state. Professor Martens says that fracture then occurs suddenly and without previous contraction, the metal exhibiting decided indications of brittleness. It may be doubted, therefore, whether steel at a temperature of 570 deg. Fahr. is capable of resisting repeated shocks or vibrations.

With regard to the endurance of steel subjected to repetitions of stress, a considerable quantity of data are available. Wohler's well-known endurance tests included experiments upon steel subjected to torsion, tension, and bending. Similar tests made by Sir Benjamin Baker included experiments on the endurance of bars subjected to repeated bending, and a large number of experiments have also been made by Professor Bauschinger. From the records thus made available we give in Table XIX. a few of the lowest and highest results. From this table it is clear that the variation of stress—which in the experiments quoted ranged either from — to +, or from zero upwards—is of more importance than its actual intensity. A singular point is that a bar of steel subjected to so many repetitions of loading as to be on the verge of failure, gives no indication in the testing machine that its strength or its ductility has been altered.

* Mittheilungen aus den Koeniglichen technischen Versuchsanstalten. Berlin, 1890, p. 159.

Table XIX.—Endurance Tests of Steel Subjected to Repetitions of Stress.

Character of Stress.	Maximum Stress.	Range of Stress, lbs. per sq. in.	Number of Repetitions.
Torsion[1] ...	48,160	48,160	373,800
,, ...	40,544	40,544	23,850,000[3]
Torsion[2] ...	25,760	51,520	859,700
,, ...	23,520	47,040	19,100,000[3]
Tension ...	85,568	85,568	18,741
,, ...	53,468	53,468	473,766
,, ...	51,340	51,340	13,600,000[3]
,, ..	58,688	58,688	40,000
,, ...	35,840	35,840	11,030,000[3]
Bending ...	74,838	74,838	104,300
,, ...	48,160	48,160	43,000,000[3]
,, ...	44,128	88,256	12,240
,, ..	34,496	34,496	3,145,020[3]

[1] In one direction. [2] In opposite directions alternately. [3] Not broken.

Nevertheless, the material actually breaks as if it were perfectly brittle. Taking this fact in conjunction with the ascertained increase of the elastic limit during repetition tests, it appears that the ductility of steel must be prejudicially affected by long continued vibration, although testing-machine observations seem to suggest that the alteration may be confined to planes of weakness. The practical lesson to be learnt by the concrete-steel designer is that the metal incorporated should not be exposed to repetitions of stress beyond safe limits of stress intensity.

The coefficient of expansion of steel is variously stated between 0·0000056 and 0·00000695. It is now usually taken at 0·0000066 for mild steel, and 0·0000069 for hard steel unit.

BOOKS RECEIVED.

Utility Fowlhouses and Appliances: No. 4 of Rural Handbooks. By H. Francklin. (Dawbarn & Ward. 6d.)

The Business Encyclopædia and Legal Adviser. Vol. iv. By W. S. M. Knight. (Caxton Publishing Co.)

Practical Building Construction. By J. Parnell Allen. Fourth Edition. (Crosby Lockwood & Son.

GENERAL BUILDING NEWS.

Rebuilding of Wednesfield Church.—Some eighteen months ago the Parish Church of St. Thomas, Wednesfield, was destroyed by fire, and immediately afterwards a committee was appointed to carry out the work of rebuilding. Drawings were prepared by Mr. Fred T. Beck, architect and diocesan surveyor, of Wolverhampton, and the contract was placed in the hands of Messrs. H. Willcock, of Wolverhampton. The whole of the edifice has been rebuilt, except the main walls of the nave and the tower at the west end, which have been repaired and pointed, and new balustraded parapets have been erected. The opportunity has also been taken for the enlargement of the church by the addition of a chancel sufficiently spacious to accommodate the choir and clergy, seats for whom were formerly in the nave. The organ-chamber has also been enlarged, vestries for the choir and clergy have been provided, and a semi-circular apse, forming the sanctuary, has also been added at the east end. The building is constructed of brick, with stone dressings, and the roofs covered with slates, the windows being glazed with new glass throughout, except those in the sanctuary, where the old stained glass which was saved from the fire has been utilised. The clock, which was entirely destroyed, has been replaced by a new one, and the bell has been re-cast. Internally the church has been remodelled in many respects, although the gallery system has been retained. The ceiling, which was formerly flat, is now arched in three spans. The galleries and roof are supported on rolled-steel stanchions. An oak balustrading forms the gallery front, which terminates at the eastern end of the nave with curved returns. The choir and clergy stalls and pulpit are executed in fumed oak, and the seating throughout the remainder of the church in pitch-pine. A font, executed in Hollington stone, has been placed near

the west end. The total cost of the whole of the works is about 5,000*l.*

WESLEYAN CHAPEL, GREAT BARFORD, BEDFORDSHIRE.—The foundation stones of the new Wesleyan chapel were laid at Great Barford recently. The church is being erected by Messrs. G. Wrycroft & Sons, of St. Neots, from plans by Mr. T. Cockrill, architect and surveyor, of Biggleswade.

RESTORATION OF CORSTORPHINE PARISH CHURCH.—A movement is on foot for the restoration of the parish church of Corstorphine in the neighbourhood of Edinburgh. The work is estimated to cost about 4,000*l.*, and it is understood that it will be almost immediately commenced, from plans by Messrs. Hay & Henderson. Externally the church will not be interfered with.

WESLEYAN SCHOOLS, OLD HILL, STOURBRIDGE.—Designs for a Wesleyan chapel and schools have been prepared by Mr. W. F. Edwards, of Birmingham, and the scheme is estimated to cost 4,500*l.* The chapel and schools are designed to accommodate 500 persons each, and are being erected by Messrs. Pugh & Sons.

UNITARIAN CHAPEL, MERTHYR. — The new Unitarian Chapel in Thomas-street, Merthyr, was opened recently. The chapel provides accommodation for 150 worshippers, and there is a schoolroom beneath. The building is Gothic in style, and is faced outside and inside with red pressed brick with Bath stone dressings, and has an open red tile roof. There are two entrances to the chapel, which is seated by open pews, and two also to the schoolroom, these being surmounted by an embattled parapet. Mr. E. A. Johnson was the architect. The contract was originally let to Mr. Edward Lumley, but the work was carried on to its completion by a committee after the death of the builder.

CHURCH, BURTON AGNES, YORKSHIRE.—It is proposed to carry out some necessary works of restoration to the church at Burton Agnes, near Driffield. A provisional scheme for repairing the church, at a cost of 1,000*l.*, has been adopted. Mr. John Bilson, F.S.A., is the architect.

RESTORATION OF BOSHAM PARISH CHURCH, SUSSEX.—A commencement has been made with the restoration of the village church at Bosham—a work which it is estimated will cost something like 2,600*l.* The work is to be confined practically to the tower, and the expenditure will not exceed 1,000*l.*, until more money has been subscribed or promised. Included in the work now to be carried out is the reshingling of the tower, the renovation of the oak work inside, a new bell frame, the recasting of one of the bells, the strengthening of the foundations, and the opening of an old Saxon window which is at present partly covered up. Messrs. Colson, Farrow, & Nisbett, of Winchester and London, are the architects.

RESTORATION OF FRIDAYTHORPE CHURCH, YORKSHIRE.—The ancient church of the Wold village of Fridaythorpe has been restored under the direction of Mr. C. Hodgson Fowler, F.S.A. Before the restoration, the church consisted of nave, chancel, and western tower, and for years had been in a very serious state of dilapidation, and the nave roof was supported by beams from the floor. After the work was begun and the plaster taken off the south wall of the nave, it was found to be in such a dangerous condition that two-thirds of it had to be taken down. All the facing stones were laid out in rows in the churchyard and rebuilt in their old position. The arcade on the north side of the nave had been built up, and it now opens to the aisle. When the arches were taken down, and the excavations being made for the present aisle, traces of another wall were found, which were apparently the foundations of the north wall of the Norman nave. The principal features of the old church, the nave of which was originally Norman, were the south doorway and the chancel arch, both of which have been kept without alteration. The doorway is a very elaborate specimen of late Norman, but shows traces of having been at some period, probably the thirteenth century, rebuilt, as many of the mouldings are out of place, and some seem to have been brought from another work. The chancel arch also was probably partially altered in the same century. The chancel appears to have been slightly altered in the same century, and the lower part of the tower is of the same date, whilst the upper part of the tower belongs to the middle of the eighteenth century. The recent additions consist of the north aisle, with a sacristy at its east end, both designed in the style of the fifteenth century, so as to show clearly that they are additions to the original church. All the roofs have been renewed in oak, with moulded beams and carved bosses. The whole of the fittings are in oak, the aisle being separated from the nave by an oak screen, which is carried across the west end, and some of the panels just inside the south door are filled so as to protect the worshippers from the draught. Under the chancel arch is another oak screen in the same position as the old one occupied. On the south-west of the nave a new porch has been erected. At the east end, which has no east window, is a carved oak triptych, designed by Mr. C. Hodgson Fowler. The carving has been done by Mr. Bridgeman, of Lichfield. The work of restoration has been carried out by Messrs. Thompson & Son, of Peterborough, Mr. Mills being foreman of the work.—*Yorkshire Herald.*

THE BIRMINGHAM CREMATORIUM. — The new crematorium for Birmingham, at Sheldon Coppice, near Rocky-lane, on the Birmingham and Walsall road, at Percy Barr, is, according to the *Birmingham Post*, rapidly approaching completion from the designs of Mr. Frank B. Osborn, architect. The chapel and crematorium stand in the centre of the land, and are approached through an entrance gateway and drive from the main road, at which there is an ornamental lodge. At the entrance to the chapel there is a large porch or vestibule. The size of the chapel itself is 50 ft. long by 25 ft. wide, and about 40 ft. high to the ridge, with an open-timbered roof, the total length of the building being about 107 ft. On one side there is a vestry and registry office with a separate entrance, and on the other side a small mortuary chamber. The chapel is principally lighted by lofty clearstory windows, and underneath these on both sides are recesses for the reception of urns containing the ashes of the dead. If relatives prefer, these urns may be placed in cloisters of ornamental design, which they will be at liberty to erect in the grounds. The chapel, which is in brick and red stone, with tiled roof, will be provided with chairs and furnished with a reading-desk. The catafalque will be against the end wall opposite the entrance, and is to stand on a stone platform approached by two steps. Immediately behind the catafalque, and concealed by curtains, is an iron door leading to an intermediary chamber. On the north-west side is an ornamental tower, 80 ft. in height, containing the stack.

CONVALESCENT HOME, SWANSEA.—The opening of the new convalescent home in connexion with Swansea Hospital took place recently. Having a south-west aspect, the building will be approached from Terrace-road. The home consists of three blocks. The centre one is the administrative block, and on either side, approached by open corridors, are two ward blocks—one ward for men and one for women. On the ground floor of the administrative block is the entrance-hall, with waiting and staff rooms, dining-hall (for use of all patients), with kitchens and offices in close proximity, and a loggia in front running the whole length of the room. On the first floor are arranged bedrooms for the staff and nurses, with bathroom, lavatories, &c. The accommodation provided in each ward block is a large dayroom, a ward for ten beds, bathrooms, and lavatories, with verandahs running the whole length of the buildings. This accommodates twenty patients. The work generally is of local stone, with brick quoins and rough cast; the top floor of the administrative block has the walls covered with red Broseley tiles, and all the roofs are covered with terra-cotta slates. The contract has been carried out by Mr. Griffith Davies, Mr. Daniel Evans was clerk of works, and the whole of the work has been designed and carried out under the supervision of Mr. Glendinning Moxham, architect, Swansea.

CHURCH SCHOOLS, GREENGATES, YORKSHIRE.—Church Sunday schools have been erected at Greengates from plans prepared by Messrs. T. and H. Healey, of Bradford, the architects. The edifice is situate on the summit of the hill on Carbottom-road, and has cost about 3,500*l.* The building is of stone, and in addition to a central hall, there is a smaller hall. There are also a number of classrooms.

JEWISH HOSPITAL, MANCHESTER.—On the 23rd ult. the foundation-stone of the Manchester Jewish Victoria Memorial Hospital was laid. The site is in Elizabeth-street, and it is estimated that the cost of the scheme, when completed, will be between 10,000*l.* and 12,000*l.*, but the work now embarked upon will involve an outlay of between 3,500*l.* and 4,000*l.*, and this will enable provision to be made for ten patients. The administration block will occupy the front of the site facing Elizabeth-street, and will afford accommodation for the resident medical officer, matron, nurses, and servants. The out-patients' department will be at the corner of Elizabeth-street and Sherbourne-street, and the in-patients' portion will face Sherbourne-street, with the ward windows overlooking the adjoining park. In this block, which will be entirely detached from the administration block, except for a subway in connexion with the kitchen, it is proposed to make provision in the complete scheme for forty patients, twenty of each sex. The architect is Mr. W. Cecil Hardisty, of Manchester.

NEW ROYAL VICTORIA HOSPITAL, BELFAST.—This building, which has just been opened by the King, is situated in Grosvenor-street. The new hospital has 300 beds, and has been designed by Messrs. Henman & Cooper, of Birmingham. Illustrations and a long description of the building appeared in our issue for December 21, 1901. The main corridor, 460 ft. long, extends from east and west, and from it seventeen side corridors open south, each leading to a complete "unit," consisting of a large ward with fourteen beds, one or two small wards with two beds each, kitchen, bathroom, &c., and either a clinical lecture-room or an operating theatre. The large wards lie side by side, only a dividing wall between two, and are lit by lantern lights in the roof, and a large French window at the south end of each opening on to a balcony and looking into the garden. The air is admitted by three openings on each side of each ward, 7 ft. from the ground, and escapes by a number of smaller openings at the level of the floor. The seventeen units are distributed two each, a male and female, to the four senior surgeons and four senior physicians, and one to the gynæcologist. The ophthalmic unit is on the north side of the main corridor, and contains two wards with six beds each, and an operating theatre with western light. There are, besides, detached buildings for septic and infectious cases, and a pathological building. Opening off the main corridor on the north are the administration block, including a wing for the resident medical staff and one for the nursing staff, and the extern department. The latter consists of a central hall, lighted from the roof like the wards, and surrounded by about eighteen smaller rooms, including medical (male and female), surgical (male and female), gynæcological, ophthalmic, emergency, recovery, &c. The two large wings of the central administrative block are the only parts of the entire building rising above one story. The ventilating system is arranged to give an entire change of air seven times an hour in winter, and ten times in summer. The cost of the hospital works out at between 300*l.* and 350*l.* per bed.

CAMBERWELL INFIRMARY, BRUNSWICK-SQUARE.—The infirmary previously existing in Havil-street consisted of one H-shaped building erected in 1873, with basement rooms, and one circular pavilion erected in 1889. These are now being altered and modernised to form part of the larger institution, which consists of twenty-one buildings standing on a site of several acres, practically surrounded by roads, and all buildings are connected by glass-covered ways and subways. It accommodates 800 patients, has a resident staff of five doctors, while the other officials, nurses, and servants number about 160. It is built of fire-resisting material, and special provision is made for escape. It contains a fully-equipped operating theatre with recovery-room attached, an electric treatment room with all modern appliances. It is electrically lighted, has electric lifts of special labour-saving type, laundry motors, electric ventilation, and a heating scheme on a system only existing in one other institution in London, erected under the same architect a year or two ago. The new pavilions are axially north and south; each consists of three main stories and a fourth one over part of the area. It has at the home end a wide staircase, with walls of glazed brick from bottom to top. At the other end it has a secondary or escape staircase, extending from the flat roof to the road, in what is practically a separate tower. There are three exits from the building. On each floor there is a ward of twenty-four beds, with windows on three sides, and other wards of six four, and two beds respectively, affording opportunity for classification. There is a ward kitchen. This and the corridors have also all their walls of glazed brick. There are other necessary offices and two sanitary towers—one for baths, one for closets, &c. These are placed near the centre of each block, so that patients from the smaller wards may not have so far to go as if the towers were at the extreme end. In some of the pavilions there are separate bathrooms and closets attached to the six-bed wards used for special diseases. The twenty-four, two, and four bed wards are open to supervision from the ward kitchen and from each other. All are well lighted, and every window opens. There is only one fireplace of faïence at the end of each ward, for cheerfulness, the heating proper being by hot water. The walls of all parts are painted in soft colours. All wards have polished teak floors, the kitchens terrazzo floors. On every floor a balcony the whole length of the large ward faces west, and is sheltered from all cold and flanking winds. The large ward on the top has been specially designed for consumptive patients. Practically the whole of the enclosures on three sides consist of opening windows, for open-air treatment, and above is a flat roof, on which patients may spend all the day. Three of the pavilions are so designed. All pavilions have electric lifts capable of taking beds of full length. These are so designed that no special attendant is necessary. By pressing a button the lift comes to the required floor, and inside, of course, it can be made to stop when required by pressing another button. The children's pavilion is four-storied, and contains wards of one, two, four, and eight beds, providing accommodation for eighty-eight patients, with eight bathrooms and sanitary appliances for boys and girls respectively, in towers at the two ends. There are two main staircases and a bed-lift; a kitchen, linen-room, &c., on each floor. The children's wards have wide balconies on each floor, capable of taking beds if desired. There are four exits from this building. The ventilation—*i.e.*, the continued circulation of air—is ensured by an extraction flue from each room, connected to main trunk shafts or conduits over the central corridor, at the end of each being an electrically driven fan. The trunk conduit is equal in area to all the subsidiary flues, and by an adjustable shutter in each of the latter the velocity of the up-current can be regulated. All sanitary apparatus—baths, closets, and lavatories—is concentrated at the end of the corridors. The heating is a special feature. Instead of the system of conveying live steam to calorifiers placed under every building, or the practice of placing a furnace in each, the system here consists in placing

only three calorifers under the immediate eye of the engineer. These are heated by exhaust steam from engines, &c., and from them water is pumped all over the institution for heating and domestic hot-water supplies. The pipes are in subways high enough to walk in, all lighted by electricity, and cross-ventilated at frequent intervals. The advantages of one heating station are obvious. The boilers are four in number, and are mounted with duplicate steam ranges. The laundries are both arranged so that linen received soiled at one end passes through, and out clean at the other. The machinery is driven by a 45-h.p. motor. Electric fans remove all steam and polluted air. The drying is by hot blast. By the system of drying-horses and the hot blast, each horse can be loaded in rotation. By the time the attendant has loaded the last one, the goods at the other end are dry and ready for removal, when the horse can be again loaded, and so on. The general contractors for the works have been Messrs. Holliday & Greenwood, of Brixton. The sub-contractors have been:—For boilers, Messrs. Fraser & Fraser; steam pipes, Messrs. Taylor & Son; electric engines, motors, and pipes, Messrs. Crompton & Co.; electric mains and wires, Messrs. Wells & Co.; electric treatment appliances, Mr. Leslie Miller; heating apparatus and hot-water supplies, Messrs. Dargue, Griffiths, & Co.; laundry machinery, Messrs. D. & G. Tullis; kitchen apparatus, Messrs. Moorwood, Sons, & Co.; electric lifts, Messrs. Waygood & Co.; fire hydrants, &c., Messrs. Merryweather; weighbridge, Messrs. Avery; entrance gates and railings, Messrs. Imison & Ottoway; disinfector and incinerator, Messrs. Manlove, Elliott, & Co. The clerks of works were Mr. Durston and Mr. Rayner; the general foreman, Mr. Price. The architect's consulting and inspecting engineers were Mr. Edward G. Hiller, of Manchester, and Messrs. Dolby & Williamson, of Westminster. The whole has been carried out from the designs and under the superintendence of the architect, Mr. Edwin T. Hall.

EUSTON HALL, SUFFOLK.—This house, the seat of the Duke of Grafton, which was almost entirely destroyed by fire in the spring of last year, is being rebuilt. Externally the general lines and character of the old building are to be maintained, but internally the arrangements have been remodelled to meet present-day requirements. The works are being carried out by Mr. Thomas Heath, of London and Towcester, under the directions of Mr. W. H. Atkin Berry, of the firm of Kidner & Berry, architects, London.

SCHOOLS, PORTSLADE-ON-SEA.—New schools in this suburb of Brighton were opened on the 22nd ult. The walls are of brick, plastered internally throughout with painted cement dados. The roofs are covered with tiles, the floors of school and class-rooms with wood blocks, and the corridors, cap-rooms, and lavatories with granolithic paving. The warming is by open fireplaces and the ventilation by Boyle's system. The architect is Mr. E. Lingen Barker.

CAPITAL AND COUNTIES BANK, BRIGHTON.—This new building at the Western corner of the principal approach to the Royal Pavilion is now completed. The architects were Messrs. Clayton & Black, Brighton.

HOSPITAL, ROCHESTER AND CHATHAM.—Mr. R. Deane Sweeting, M.B., one of the Inspectors to the Local Government Board, recently held an inquiry as to the application of the Joint Hospital Board for Rochester and Chatham for sanction to borrow 2,400*l.* for further enlarging and improving St. William's Hospital for Infectious Diseases. The loan now being asked for is 1,700*l.* to meet the cost of additional works and improvements to complete the new buildings, plans for which were approved by the Local Government Board in 1901, when a loan of 9,000*l.* was sanctioned. The remaining 700*l.* is needed for furnishing the new blocks. Mr. Bond, the architect, explained in detail the alterations and additions to the observation ward block, the administration block, the convalescent block, the isolation block, the discharge block, porter's lodge, kitchen, doctor's room, and a separate contract (185*l.*) for a stable and coach-house. He explained that a very heavy item of expenditure beyond the original estimate was caused by 4½ in. more brickwork having to be put round the whole of the buildings—making the walls two and a-half bricks thick—to comply with the by-laws of the city of Rochester.

MISCELLANEOUS.

CEMENT IN BULGARIA.—In the Report on the trade of Bulgaria for the year 1902, by the British Consular officers, the following passage occurs:—"Portland cement is well known and liked, but conditions are too inelastic and prices too high. It is believed that a great part of the success of our Continental competitors results from their making barrels of any size desired, and it might be sold by weight."

LIBRARY, BRENTFORD.—The Countess of Jersey laid the foundation stone on the 27th ult. of the new free library in Clifden House grounds. Mr. Nowell Parr is the architect. Situated near by the municipal buildings the library will be entered by a porch leading to the main hall. On the left and right respectively are the reference library and newspaper room, and at the rear the lending department. From the hall a teak staircase will lead to the lecture-room and museum. The lending department is 39 ft. long by 27 ft. wide, with bookshelves to accommodate 20,000 volumes. The reference department is a room 30 ft. 6 in. by 20 ft., and will accommodate about thirty readers at one time.

TIMBER TRADE OF SWEDEN.—According to an official Report just to hand, the export of deals, battens, and boards (planed and unplaned) from the whole of Sweden, in St. Petersburg standards, was last year 1,004,606, as compared with 903,787 in the previous year, 1,009,448 in 1900, 1,026,692 in 1899, and 1,015,835 in 1898. The shipments to the United Kingdom in 1902 comprised 449,198 standards as compared with 399,376 in 1901, 450,887 in 1900, 486,076 in 1899, and 468,782 in 1898. From this return it appears that the total export of these kinds of wood during 1902 amounted to about 11 per cent. more than in 1901, but, with the exception of the latter year, one must go as far back as 1893 to find such low figures. There was an increase of about 50,000 standards to the United Kingdom as compared with 1901, which itself was the poorest year since 1896.—Mr. Carrick, British Vice-Consul at Gefle, in a recent communication to the Foreign Office, remarks that "the tendency observable in the timber trade of Sweden of late years to amalgamate the large sawmill companies, and thereby to obtain control of large areas of standing wood, to the exclusion of competition, made great progress in 1902. These combinations are not only rendering it increasingly difficult for the small millowner and shipper to exist, but are likewise rapidly absorbing the estates of the peasant proprietors. Whether the transformation of the latter from a comparatively independent position to that of mere dependants on the large sawmill companies is advantageous for the country at large may well be doubted."

HOUSING SCHEME, BLACKLEY, MANCHESTER.—Colonel A. G. Durnford, on behalf of the Local Government Board, held an inquiry in the Lord Mayor's Parlour, at the Manchester Town Hall, on the 21st ult., into the application of the Manchester Corporation for sanction to borrow 10,000*l.* for the purposes of their schemes for the provision of dwellings at Blackley. Mr. Hudson, the Deputy Town Clerk, who represented the Corporation at the inquiry, explained that 60,000*l.* had already been borrowed by the Corporation for the housing schemes at Blackley. The schemes had been undertaken to fulfil certain obligations incurred by the Corporation by the demolition of property for street improvements. The City Council had agreed to construct eighty houses to meet their obligations in Rochdale-road, fifty houses in respect to property demolished in Ardwick, twenty houses with respect to Millgate, and fifty-three houses were to be built under the powers granted to the Corporation under the Housing of the Working Classes Act. The estimates for the work showed that it would cost 62,707*l.* To that had to be added the cost of making certain side roads, which were needed in order to erect the cottages, and that amounted to 7,293*l.* Included in that sum was the cost of forming the roads, making them up in a sufficiently substantial manner, and of sewering the roads. The 7,293*l.*, together with the balance of 2,707*l.* on the 62,707*l.*, made up the sum for which the borrowing sanction was asked. Evidence as to the details of the work having been given by Mr. T. de Courcy Meade, the City Surveyor, and Mr. H. Price, the City Architect, the inquiry was closed.

HOUSING, BIRMINGHAM.—The Housing Committee of the Birmingham City Council report to the City Council that they have been in negotiation with the owners of properties in the various parts of the city for the removal of obstructive buildings at the entrances to courts, for the purpose of admitting more light and air to the houses in the courts. In this connexion they have been in negotiation with the representatives of the freeholders, and with the lessees of a block of property fronting to William-street and Bishopsgate-street, shown on a plan accompanying the report. The plan is in duplicate, Print A showing the present arrangements of the buildings, and Print B showing the alterations proposed by the committee. It is suggested that the following buildings be removed:—No. 99, William-street, and Nos. 5 and 6 at rear, also the shopping at rear of No. 100. No. 102, William-street, and No. 6 at the end of the court. No. 103, William-street, and the shopping at rear. No. 106, William-street. The front of No. 28 Court. The stable, &c., to be demolished and the site paved. No. 6 Court, Bishopsgate-street—one house on the right at the end of the court. No. 7 Court, Bishopsgate-street—one house at the end of the court. No. 9, Bishopsgate-street—one house at the end of the court. No. 31, Bishopsgate-street, and the house at the end of the court at the rear thereof. Arrangements are being made between the freeholders and the leaseholders for the surrender of the present leases, the outstanding terms of which are fairly short, and the granting of new leases. The conditions of the renewal of the leases will include the thorough repair and rearrangement of the houses and out-houses; congested courts will be cleared of obstructive buildings and opened up to the street, thus admitting an increased supply of light and air to the houses that remain in the courts. All pan closets will be converted to water-closets. In addition to the above buildings, the committee have also been in negotiation with the owners of the undermentioned obstructive properties for their removal, viz.:—No. 52, Dartmouth-street; No. 7 and No. 18 at rear, Bishopsgate-street; No. 29, and No. 2 at rear, Lower Tower-street; No. 19, and No. 6 at rear, Brearley-street; House in No. 19 court, New John-street; House in No. 4 court, Manchester-street. No. 25, Manchester-street. House in No. 14 court, Great Barr-street. The committee have carefully gone into each case, and now recommend that they be instructed to proceed with the completion of the negotiations. The amount of compensation which will have to be paid to the various owners of all the obstructive buildings now referred to is estimated at 1,000*l.* It should be stated that this amount is intended to include the pulling down of the buildings and the paving of the sites, which will be kept permanently open. The small cost to the Corporation of these improvements will, in the opinion of the committee, be justified by a reduction in the death-rate, and the improvement in the health of those living in the neighbourhood that must ensue from the increased supply of light and air, and the substitution of modern sanitary conveniences. The committee submit the following figures showing the details of the work dealt with by them to June 30 last:—Represented by Medical Officer of Health to date, 656 houses; closing orders obtained, 114; houses rendered habitable, 157; houses demolished, 35; houses undergoing repairs, 143; legal notices unexpired, 247; negotiations pending, 74. This does not include all the houses that have been repaired and rendered habitable, as in many instances where two or three houses have been represented in a court, the committee have been able by negotiation to obtain the proper repair of the whole of the houses in the court. The committee ask for the appointment of another inspector experienced in the building trade, at wages of 35*s.* per week.—*Birmingham Post.*

WHITE MASTIC TUCK POINTING.—A correspondent asks us for a recipe for white mastic tuck pointing. We may say that a mastic which will be very nearly white can be made by mixing two parts of white lead, three parts of fine silver sand, and three parts of lime, with linseed oil; but whether this is the composition intended we cannot say, as the term "white mastic" is very indefinite. In America a putty composed of lime, plaster of Paris, and white lead is sometimes used for pointing. If the description occurs in a specification, the best course will be to ask the writer of the specification for a recipe.

BRIDLINGTON PARADE EXTENSION.—At the Town Hall, Bridlington, recently, Mr. W. O. E. Meade-King, M.Inst. C.E., conducted a public inquiry relating to various sums of money to be borrowed for purposes of constructing the Victoria Sea Defences, a new footpath, an extension of the Prince's Parade, &c. The Town Clerk (Mr. A. E. Matthewman, B.A., LL.B.), the Borough Surveyor (Mr. E. R. Matthews, C.E.), Mr. C. Palmer (Parade Manager), and Mr. W. H. Littlewood (representing the firm of Messrs. Magnall & Littlewood, architects), were present.

HUMAN REMAINS IN LIVERPOOL-STREET.—In excavating the roadway at the western end of Liverpool-street, E.C., for the construction of an underground lavatory the workmen have found a large amount of human remains—so large, indeed, that it is deemed advisable to suspend operations for the present, and to obtain authority for their proper reinterment elsewhere. In one portion of the sinking the skulls and bones were massed together as though the burials had been made hastily in a pit, but in another portion they are mingled with coffin-handles and other indications of more orderly burial. The terminus in Liverpool-street stands on the site of the first Bethlehem Hospital, originally founded as a priory of canons, with brethren and sisters, in 1246, and dedicated to St. Mary of Bethlehem, by Symon FitzMary, sheriff for that year. In 1866 the Great Eastern Railway Co. paid to the hospital governors a sum of 61,000*l.* for the site of their terminus. Before the building of the adjoining North London Railway terminus, opposite the end of Broad-street, the recipients of the Pitt dole of sixty loaves used to attend on each Whitsun-day in a private garden which had been a burial-ground appertaining to the hospital. Stow records that in the year 1569 Sir Thomas Roe, Mayor, "caused to be enclosed with a wall of brick about one acre of ground being part of the hospital of Bethlehem. . . . . This he did for burial and ease of such parishes in London as wanted ground convenient within other parishes." It seems very likely, then, that a part of the old graveyard is now disturbed, its existence having become forgotten. Within one hundred years after its establishment the priory is named as a hospital (1330); in 1346 it passed under the protection of the City, and in 1546 the Corporation bought the patronage, property, and buildings, with a bequest, *ad hoc*, of Stephen Gennings, citizen. The hospital was known as an asylum for lunatics in the early years of the fifteenth century, when, as Stow says, "a King of England not liking such a kind of people to remain so near his palace," had caused certain lunatics to be removed from Charing Cross to Bethlehem in Bishopsgate Without. After

the Dissolution, Henry VIII. having confirmed the purchase by the Corporation, Bethlehem became the "Bedlam," which it has been ever since, and continued on that site until the building, in 1675-6, by Robert Hooke, the celebrated mathematician, as City Surveyor, of the hospital in Moorfields, against the northern side of the London Wall. The registers of St. Botolph, Bishopsgate, contain an entry: "1608, April 9. Buried, Lady Mary Bohun, *alias* Stafford, bd. out of Bethlehem House, aged 140."

SEWERS.—The following local sewers are to be constructed:—Camberwell: 615 ft. of 9-in. pipe and concrete sewer in proposed new road between Forest Hill-road and Underhill-road to be called "Ryedale." Fulham: 750 ft. of 12-in. pipe and concrete sewer in Micklethwaite-road from Halford-road to Farm-lane. Lambeth: 1,175 ft. of 15-in. pipe and concrete sewer in an extension of Sadbourne-road to Brixton Hill.

MIDDLEWICH CHURCH.—There has been recently placed in the north aisle of St. Michael and All Angels, the parish church of Middlewich, Cheshire, a large four-light window of stained glass, the subjects chosen being "Christ Preaching," "Christ, the Good Shepherd," "Christ Knocking at the Door," and "Christ Healing the Sick." There are also four adoring angels in the tracery. The work has been carried out by Messrs. Pepper & Co., of London, from the designs of Mr. R. Wylie, architect, &c., Liverpool.

ROYAL INSTITUTE OF PUBLIC HEALTH: LIVERPOOL CONGRESS.—At an adjourned meeting of the Preventive Medicine and Vital Statistics Section, held on Tuesday, July 21, it was proposed by Dr. Vacher, County Medical Officer of Health for Cheshire, seconded by Dr. H. Scurfield, Medical Officer of Health, Sunderland, and unanimously resolved: "That this 1903 Congress of the Royal Institute of Public Health, held at Liverpool, approves of the efforts made by the Worshipful Company of Plumbers in promoting the Plumbing Registration Bill, believing that such a measure will be for the safeguarding of the public health and beneficial to all classes of the community, and appeals to the Government to give facilities and support to the measure."

ST. BARTHOLOMEW'S HOSPITAL.—It will be recollected that as a result of the criticisms of the appeal for the enlargement of St. Bartholomew's Hospital, a committee was appointed at a Mansion House meeting last January to report on the matter. The committee have now reported. They have come to the conclusion that the value of the site of St. Bartholomew's Hospital has been much exaggerated, and that there would be very little, if any, ultimate money profit to the hospital in removing the building from its present situation to any other locality. The committee next carefully considered the present buildings of the hospital, and the necessary additions demanded by the medical and surgical staff. They are satisfied that important additions to and a considerable rearrangement and improvement of the existing buildings are necessary, and they consider that, with the additional land purchased from Christ's Hospital, there will be ample room for the provision of a hospital with every modern appliance. The committee, having carefully examined the several plans placed before them, consider that a thoroughly efficient hospital can be provided by a gradual building scheme under which the improvements and alterations contemplated can be secured so soon as funds are obtained. The committee are assured of the great value of the medical school to the hospital and the public. For the continued efficiency of the treatment of the patients, the teaching in the school and the advancement of medical science, greater facilities for research and teaching are absolutely necessary, and call for additional accommodation. The committee recommend that the rebuilding of such parts of the hospital as are most urgently needed be proceeded with so soon as sufficient funds are collected.

LEGAL.

NUISANCE CASE IN SLOANE-STREET, W.

THE hearing of the case of Ash and another *v.* The Great Northern Piccadilly and Brompton Railway Co. concluded last week before Mr. Justice Kekewich in the Chancery Division.

The action was brought by the plaintiffs, tenants of residential flats at No. 7, Sloane-street, London, for an injunction to restrain the defendants from causing a nuisance in the construction of certain works on and under a piece of land adjacent to the plaintiffs' premises, near the site of the Sloane-street station on the section of their Tube Railway between South Kensington and Piccadilly-circus.

The facts were these:—In March, 1902, defendants, before acquiring Parliamentary powers, by agreement with the landowner, entered upon the piece of land and sunk a shaft within about 25 yards of the plaintiffs' premises in order to clear away the soil taken from this section of the tunnel and to connect the station with the tunnel by a subway. Defendants continued this work night and day, and plaintiffs' case was that the noise caused by the carting of earth, hammering timber, and using a steam crane, &c., during the night caused an intolerable nuisance to themselves and the tenants in the flats, and that the value of the flats was thereby being greatly diminished.

Defendants relied on the statutory powers they subsequently obtained, and contended that they had acted reasonably in the construction of their work.

In the result, Mr. Justice Kekewich, after hearing the evidence, in giving judgment, said that by the Act of 1902, which received the Royal assent in November of that year, the Company had power to enter upon, take, and use the piece of land in question. In the previous March, however, the defendants entered into possession by private agreement with the landowner for a long lease for the purposes only of building a station. In doing that the Company anticipated their Parliamentary powers at their own risk, and had no power to use the land for the general purposes of their undertaking. It was not until November, 1902, that their possession became lawful for the purposes of the Act. Upon the construction of the Act his lordship held that the Railway Company were authorised to use the piece of land in question for the general purposes of their undertaking, and that the Act could not fairly be construed otherwise. It followed that from November, 1902, they could use this land for the general construction of their railway. His lordship held that there had been a common law nuisance by the defendants, but that the Railway Company had acted reasonably in carrying out the work, and had promised to do what they could to reduce the noise, &c. On general grounds he was, therefore, in favour of the defendants, but as Mr. Ash, one of the plaintiffs, had given uncontradicted evidence that from March to November, 1902, when the defendants had no exemption by statutory powers, he and his family had suffered from the nuisance caused by a traction-engine upon the works, the Railway Company must pay him 20*l.* damages. Apart from this, the plaintiffs' action failed, as from November, 1902, the defendants had acted reasonably in the exercise of their statutory powers.

Mr. Warrington, K.C., and Mr. Cozens Hardy appeared for the plaintiffs, and Mr. Roskill, K.C., and Mr. Clauson for the defendants.

ACTION ON A COVENANT.

THE case of Moore *v.* Todd came before the Court of Appeal, composed of Lords Justices Vaughan Williams, Romer, and Stirling, on the 24th ult., on the defendant's appeal from a decision of Mr. Justice Bigham in the King's Bench Division.

It appeared that the defendant, the Rev. J. W. Todd, of Forest Hill, Kent, wishing to develop some land fronting the road at Bromley, for building purposes, widened the roadway running by his land and constructed a road and metalled and made up the surface. The plaintiff, being the owner of property on the opposite side of the road, agreed to contribute 250*l.* towards defendant's expenses in improving the road and in the deed entered into between the parties was a covenant by the defendant that the plaintiff, his heirs, or assigns, or his or their tenants should not be under any liability to contribute to the maintenance or repair of the roadway and sewer and main drain, or any works connected therewith; but, on the contrary, that the same and every part thereof should be wholly maintained by the defendant and his heirs, executors, &c., until the same should be taken to by the Local Authority. In 1901 the Beckenham Local Authority served the frontagers with notice to make up the road, and, in default, executed the work themselves, and charged the frontagers with the cost, under Section 150 of the Public Health Act, 1875. The plaintiff's share of the costs under this amounted to 108*l.*, and he brought the present action to recover that sum from the defendant, under the terms of the before-mentioned covenant. Mr. Justice Bigham held that the object of the covenant was to protect the plaintiff from this kind of liability, and gave judgment for the plaintiff for the amount claimed. Hence the present appeal of the defendant.

At the conclusion of the arguments, Lord Justice Vaughan Williams, in giving judgment, said that the object of the covenant was to protect the plaintiff from any kind of liability which he became subject to by reason of the statutory notices served by the Local Authority. It was clear from the covenant that the road was to be wholly and solely maintained by the defendant until it was taken over by the Local Authority; but the question was whether the defendant was liable to indemnify the plaintiff against the sums which the plaintiff was called upon to pay by the Local Authority by reason of the excercise by the Local Authority of their rights and powers to sewer, pave, &c., under the Public Health Act, 1875. He thought, however, that the word "contribute" in the covenant might properly be limited to contributions for maintenance and repairs which from time to time became necessary for the roadway which had been made by the defendant and to the expenses which the plaintiff had contributed. As his lordship entertained that view very strongly, he thought the appeal should be allowed with costs.

Lords Justices Romer and Stirling concurred, and the appeal was accordingly allowed with costs.

Mr. C. A. Russell, K.C., and Mr. C. C. Scott appeared for the appellant; and Mr. J. Eldon Bankes, K.C., and Mr. R. V. Colam for the respondent.

TARPAULIN SHELTERS ON SCAFFOLDS.

QUESTION AS TO SUB-CONTRACTOR'S NEGLIGENCE.

AT the Marylebone County-court, on Tuesday, before Deputy-Judge Fitzroy Cowper, Miss Frances Spatman, a machinist, Bow Common-lane, E., brought an action against Mr. H. G. Barrett, builder (trading as H. G. Barrett & Co.), 59, Fernhead-road, Paddington, W., also against Mr. William H. Voyce, a bricklayer, 18, Felixstowe-road, Kensal Rise, N.W. The plaintiff claimed 25*l.* damages in respect of personal injuries, said to have been sustained owing to negligence on the part of the defendants or their servants.

Mr. E. Overhead, counsel, appeared for the plaintiff, and Mr. A. H. D. Nonweiler, solicitor, for the two defendants.

Plaintiff's counsel stated that on May 7 last his client was walking along Middlesex-street, E., and as she was about to pass a scaffold, erected for building operations which were being carried on by Messrs. Barrett & Co., a wooden beam fell from a window above upon plaintiff's shoulder with a dreadful crash. By the blow the young woman was struck to the ground, where she remained for a time unconscious. Owing to the injuries the plaintiff was prevented from returning to business for eight weeks. In a letter written to plaintiff's solicitors, Mr. Barrett said, "Mr. W. Voyce, bricklayer, of 18, Felixstowe-road, Kensal Rise, is liable for whatever has happened. He has taken the work piecework from me."

After the accident Voyce called upon the plaintiff, explaining that he had taken the "pointing" work at the job from Mr. Barrett, and then offered her 10*s.*

The plaintiff bore out counsel's opening statement.

In cross-examination, plaintiff denied that it was windy at the time of the accident, and added that after the accident Voyce said it was owing to the negligence of some one that the board fell.

Miss May Spatman, the plaintiff's sister, gave evidence relating to the accident; and a medical man described the plaintiff's injuries.

Mr. Nonweiler submitted that there was no evidence of negligence against Mr. Barrett.

His Honour agreed and held accordingly, granting a nonsuit in respect of Mr. Barrett, with costs.

The defendant Voyce was then called. He stated that he had taken the pointing work at the job in question, and in consequence of the wet weather he was obliged to fix up a large piece of tarpaulin for the men to work under. The piece of timber in question was used to support the tarpaulin. Suddenly a gust of wind came and the board was blown to the ground.

The Judge: I think on this defendant's own showing there is evidence of negligence on his part. It was a careless thing to do, I think, to put up this tarpaulin in such a way on a windy day. It was evidently risky putting up such a shelter, but if it was put up precautions should have been taken to see that it was perfectly secure. I find for the plaintiff against Voyce for 12*l.* 15*s.*, with costs.

POINT UNDER THE LONDON BUILDING ACT, 1894.

IN the Court of Appeal, composed of the Master of the Rolls and Lord Justice Mathew, on the 28th ult., the case of *In re* an arbitration between Wm. Stone and Arthur H. Hastie came on for hearing on the appeal of A. H. Hastie from an order of Mr. Justice Walton in chambers.

Mr. Hansell appeared in support of the appeal, and Mr. Clavell Salter for the respondent Stone.

Mr. Hansell, in opening the case, said the appeal was from an order of Mr. Justice Walton in chambers by which the learned Judge partially reversed the order of the Master. The application before the Master was under Section 12 of the Arbitration Act for leave to enforce an award made under the provisions of the London Building Act, 1894, the Master giving leave to enforce the award. The award contained three heads of claim, as to two of which there was no dispute. Mr. Stone objected to the third head of claim, and he appealed from the order of the Master to the Judge, and he reversed the order of the Master and refused leave to enforce the award under the one head in dispute. The case involved a question of general importance on the construction of the London Building Act. The facts were these:—The appellant was the lessee of No. 17, Queen-street, Mayfair. He took the lease from trustees from June 24, 1897, for twenty-one years at a rent of 300*l.* per annum. Before the lease was granted by the trustees, the lessors had to partially rebuild the party-wall between No. 16 and No. 17, and they paid the expenses, whatever they were, of the rebuilding. Mr. Stone, the respondent, in 1901 or the beginning of 1902, acquired the long lease of No. 16, Queen-street, and on January 18, 1902, gave a notice under the London Building Act, as building owner, to Mr. Hastie as adjoining owner of the work he (Mr. Stone) intended doing. This included the cutting into and making an extended use of the party-wall in question. At the bottom of the notice there was added these words:—"I hereby appoint

Messrs. Rolfe & Matthews to act as my surveyors." Mr. Hastie, not assenting to the proposed work, appointed a Mr. Willoughby as his surveyor in the dispute which had arisen. The two surveyors between them appointed Mr. Douglass Mathews the umpire. Mr. Hastie claimed 18*l.* for the damage done during the building operations, and there was no dispute about that part of the claim. He also claimed compensation in regard to the extra use which was being made by Mr. Stone of the party wall. The two surveyors and the umpire met and the points were raised, and on April 25, 1903, they issued the award. They awarded (1) 18*l.* for the damage done, which was agreed to, and (2) that the sum of 38*l.* 10*s.* 6*d.* be paid by the building owner in payment of the extra use of the party-wall in excess of the portion previously used as the party-wall of the old building formerly occupying the site of No. 16, Queen-street. Mr. Hastie took up the award on May 22, and then a summons was issued for leave to enforce the award under the Arbitration Act. The learned counsel said that under the provisions of the London Building Act an award could only be questioned by an appeal to the County Court within fourteen days after it had been taken up. That was the first point to be considered.

The Master of the Rolls: What was the date of the taking up of the award?

Mr. Hansell replied he thought it was May 22. There was no dispute that the fortnight had elapsed before any proceeding was taken. On June 17 Mr. Hastie took out a summons to enforce the award as a judgment of the High Court, and the Master gave leave to enforce the award. The matter then came before the Judge, and on July 19 he gave his decision. He enforced the award as to the payment of the 18*l.* to Mr. Hastie, and directed that the latter should pay the costs of the award. He, however, refused to enforce the award as to the amount for the extended use of the party-wall. The learned counsel contended, first, that it was not open to the respondent to question the award except by the process pointed out by the London Building Act; secondly, that as the matter had been discussed and considered by the respondents' own arbitrator, who had signed the award, he could not now go behind it by an application of this sort; and thirdly, that Mr. Hastie was the person to whom the 38*l.* 10*s.* 6*d.* should be paid, and not to the lessors, the trustees. Mr. Stones's contention was that Mr. Hastie had no right to have contribution for expenses which he did not pay out of his own pocket. He (Mr. Hansell), however, submitted that he had, and that the learned Judge was wrong on the matter, and that the Master's order should be restored.

Mr. Clavell Salter submitted that the view taken by Mr. Justice Walton was right. In the first place, the trustees, being the owners of No. 17, improved and enlarged that house, and in doing so raised the party wall between Nos. 16 and 17. That was a thing done a good many years ago, and before Mr. Hastie had any connexion with the matter. That was done under the London Building Act, and no doubt all proper notices were served. That being so, the trustees of No. 17 were the building owners. The building owners, the trustees, had to pay the whole of the expenses of raising the party wall since it was for their sole benefit they did it. No further advantage having been taken of the raising of the party wall, Mr. Stone became the lessee of No. 16, and after that Mr. Hastie acquired the lease of No. 17. Then the next thing that happened was that Mr. Stone was minded to improve No. 16, and part of the important works he contemplated involved a raising of his house, and the use of the party wall which the trustees had raised.

Lord Justice Matthew: Supposing there was no statute, to whom would Mr. Stone be responsible for interfering with the party wall? Surely the man in possession of it—Hastie.

Mr. Salter: At common law I think he would have the right of using the party wall without any payment.

Lord Justice Mathew: But if he encroached on his neighbour's rights an action would lie.

Mr. Salter continuing, said that the next material fact was that when Mr. Stone contemplated his improvements he served upon Mr. Hastie, who had become the adjoining owner, the necessary notice. The position was reversed, and in consquence of that reversal of position the surveyors had had some confusion. The effect of giving it was that unless Mr. Hastie within a given time served a notice of acquiescence then, under Section 90 Sub-Section 7 of the Act, "a difference was to be deemed to have arisen." The effect was to constitute a technical Court under the Act consisting of surveyors for the purpose of adjusting the differences between the parties. He (counsel) submitted, however, that there was nothing in the Act which gave the tribunal power to order Mr. Stone to pay a sum of money which he was under no liability to pay. Mr. Stone was perfectly willing to pay Mr. Hastie the claim for the damage and inconvenience caused him by the work next door. The trustees had also put forward a claim for compensation for the user of the party-wall. It was clear that Mr. Stone had to pay something for the user of the party-wall. It might be that he had to pay Mr. Hastie all, or the trustees all, or he might have to pay part to the trustees and part to Mr. Hastie. It might also well be that there could be a series of persons who could all claim compensation from Mr. Stone. None of those persons were parties to the arbitration except Mr. Stone and Mr. Hastie.

Lord Justice Mathew said it seemed impossible to say that Mr. Hastie was not the adjoining owner. He seemed to have been treated by everybody as such.

Mr. Salter contended that Mr. Hastie, as the tenant, was not entitled to have any compensation under the disputed head of claim. He had spent nothing, and was therefore entitled to nothing. He submitted that Mr. Stone ought to pay the trustees, and there was nothing in the Act which enabled the trustees to get any share out of Mr. Hastie.

At the conclusion of the arguments of counsel, the Master of the Rolls said that having regard to the importance of the question raised, the Court would deliver judgment the following morning.

In giving judgment on the 29th ult., the Master of the Rolls, having gone *in extenso* through the material sections bearing on the question in the London Building Act, 1894, said it seemed to him that the tenant, Mr. Hastie, had no property in the sum to be paid by Mr. Stone for the user of the party wall. The provisions in the Act aimed at the recoupment of the person at whose expense the party wall was built. Mr. Hastie had not become tenant until after the expense had been incurred by the lessors. He thought that the learned Judge had come to a proper decision on the matter, and that the arbitrators had no jurisdiction to deal with this part of the claim. He thought, therefore, that the appeal failed, and must be dismissed with costs.

Lord Justice Mathew concurred.

POINT UNDER THE METROPOLIS LOCAL SPACES ACT.

The case of Boyce *v.* The Mayor, Aldermen, and Councillors of the Metropolitan Borough of Paddington came before the Court of Appeal, composed of Lords Justices Vaughan Williams, Romer, and Cozens-Hardy, on the 25th ult., on the appeal of the plaintiff from an order of Mr. Justice Buckley in the Chancery Division.

Mr. Astbury, K.C., and Mr. Mark Romer appeared for the appellant, and Mr. H. Terrell, K.C., and Mr. Nash for the respondents.

Mr. Mark Romer in opening the case stated that it had been opened in that Court before, but had stood over with the view to an arrangement being come to. He said the writ had been amended by adding the Attorney-General as a co-plaintiff in the interest of the public, and the only question to be determined was whether the Borough Council were entitled to erect upon the disused burial ground of St. Mary, Paddington, now under their management as an open space, a hoarding, so as to block out the view from the windows of flats built by the plaintiff overlooking the garden. The Metropolis Local Spaces Act of 1881 provided that it should not be lawful to build upon a disused burial ground so preserved except for the purpose of enlarging the church, and for that reason the course which the Council were taking could not be justified. The plaintiff disclaimed the right to any easement of light or air over the open space.

Mr. H. Terrell, for the defendants, desired to say that he was mistaken when he stated at the previous hearing that they had offered not to erect the screen if the plaintiff would contribute to the maintenance of the gardens. A proposal was made by the managing committee of the gardens that he should contribute 100*l.* a year to that object, but that was not approved by the Council. The only purpose that the Council had in view was to compel the plaintiff to carry out his original agreement to provide in the middle of the flats he was erecting a passage 30 ft. wide, giving the public greater facilities of access to the gardens.

Mr. M. Barlow represented the Vicar.

The Lords Justices dismissed the action as against the Vicar, and did not interfere with the order of the Court below as to his costs, but they did not think he ought to have any costs of the appeal. In their judgment, what the Borough Council were threatening to do was inconsistent with their duties under the statutes. The plaintiff succeeded in the action, and was entitled to an injunction restraining them specifically from erecting the screen so as to prevent the access of light coming over the ground to the plaintiff's windows. The plaintiff would have the costs of the appeal, but there would be no costs in the Court below.

PATENTS OF THE WEEK:

APPLICATIONS PUBLISHED.*

14,871 of 1902.—A. G. Considere: *Construction of Buildings, Bridges, Arches, and the Like in Strengthened Concrete or Similar Material.*

In the construction of stiffened concrete the formation of the beams in which the core of concrete or the like is surrounded by metallic hooping, either external or embedded, provided of independent consecutive closed circular bands or of helicoidal spirals.

15,447 of 1902.—J. Lyons: *Devices for Securely Fastening Sashes of Windows and the Like.*

A fastener for the sashes of windows and the like, the said fastener having a horizontal portion upturned at one end and downturned at the other end, and an intermediate upstanding part through which and the upturned end is passed a screw provided at one end with a milled head or other terminal and at the other end with a revolvable cup containing the rubber or other pad.

19,376 of 1902.—J. Barker: *Bolts applicable for Warehouse and other Doors.*

Bolts applicable for warehouse and other swinging or folding doors or windows constructed with a rotable disc or lever connected to the ends of the bolts or bolt-bars by links pivotted thereto, and a stop piece against which the links rest when the bolts are shot to their full extent.

19,460 of 1902.—W. Birch: *Construction of Domestic Fire-grates or Ranges.*

A domestic fire-grate and range, with or without a boiler, having an extra air-chamber supplying air to the fire through a perforated face, and the combination therewith of diaphragms and openings for conducting, after heating, any desired proportion of air into the flue, where it shall meet and mix with the products of combustion.

347 of 1903.—J. W. Crofts: *Shop-window Casings.*

A shop-window casing constructed and arranged in such a manner as to permit of it being moved so that its inner side, which is fitted with shelves or other supports for goods to be displayed, may face the interior of the shop.

4,876 of 1903.—W. Oates: *Composition for Forming Joints for Earthenware, Fireclay, Stoneware, and other Glazed Goods.*

A composition for forming joints for earthenware, fireclay, stoneware, and other glazed goods consisting of ground fireclay, sulphur, and red lead mixed together.

7,495 of 1903.—J. Harsen and the Crown Seat Co.: *Closet Seats.*

In a closet-seat composed of a plurality of sections fitted together, openings in the ends of said sections adapted to register with each other when said sections are fitted together and terminating in recesses in the lower face of each section, bolts passing through said openings into said recesses, and nuts in said recesses adapted to receive the ends of said bolts, and engage the wall of each of said recesses nearest the end of the section to draw adjacent sections together.

9,122 of 1903.—R. Schlegelmilch and the Actien Maschinenfabrik "Kyffhauserhutte" vormals P. Reuss: *Chimney-tops and Cowls.*

A chimney-top with rotatable cowl, in which a bow-shaped support is inserted into the chimney and provided with a socket covered by a cowl and closed at its lower end, said socket enclosing a spindle acting partly as a step pivot and partly as a spindle, and in its latter capacity in contact with the inner wall of said socket by means of a ring or collar, so that the space remaining free between the spindle and socket can be filled with lubricant.

11,040 of 1903.—C. Nunan: *Grates for Fireplaces.*

The combination, with a supporting frame open at the front, of a cross strip loosely mounted in the open front portion of the said frame, a grate section connected to said cross strip, and having lugs loosely engaging the back of the frame and provided with grate-bars, a grate body supported upon the frame, and movable longitudinally thereon, and having a series of grate-bars therein, arranged above the spaces between the bars of the grate section, connected to the cross strip, and brackets on the latter section engaging the bars of the grate body.

12,309 of 1903.—H. Johnson: *Manufacture of Tiles and the Like.*

The combination, with a tile-die of a plate loosely attached thereto, and shaped so that it forms an undercut recess in the tile, which is automatically disengaged from the plate when the tile is lifted from the die.

14,937 of 1902.—Sutcliffe, Speakman, & Co, Ltd., and E. R. Sutcliffe: *Method of Making Bricks or Blocks, of Concrete, Clay, and the Like, by Pressing in Moulds.*

A method of producing bricks or blocks of sand, lime, and the like by pressing in moulds, characterised by the material being subjected to a preliminary pressure by means of a wedge-shaped plunger, and afterwards to a final pressure whereby it is claimed a sharp-edged brick is produced of great density on both of its faces.

16,193 of 1902.—J. Hailwood: *Apparatus for Heating, Softening and Purifying Water.*

In apparatus for purifying water by mixing it with a precipitating reagent, the arrangement for controlling the admission of water and reagent to the purifier by means of a float which directly operates valves in the water and reagent supply pipes.

17,378 of 1902.—P. Cottancin and A. Vye-Parminter: *Strengthened Concrete and other Building and Structures.*

In building constructions, plates, slabs, or frames connected together by chains, bars, tubes, or wires,

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

the space between said plates, slabs, or frames being filled with some suitable material such as concrete.

17,579 of 1902.—B. J. B. MILLS (Siegle): *Artificial Building Materials.*

A process of manufacturing silicious agglomerates, hardened by steam, and having metallic carcases, characterised by the fact that the said metallic carcases are submitted to an oxidation of their surface, as regular as possible, before being introduced into the plastic mass.

18,333 of 1902.—W. T. SUGG: *Lanterns for Public Incandescent Gas Lighting.*

In gas lamps or lanterns the combination of a cast metal socket, a solid lamp bottom, a cradle provided with an inlet for a torch in the solid bottom and a ball valve.

18,882 of 1902.—F. H. SHAW: *Clamps or Clips for Retort Stands.*

An adjustable clamp or clip for retort stands, consisting of a pair of gripping jaws, which are adjusted towards or away from one another along a bed plate or rest by means of a traversing screw mounted in bearings on the said plate or rest, and having right and left hand threaded parts respectively passing through correspondingly wormed holes in the shanks of the jaws, which are prevented from turning around the axis of the screw and from twisting about their major axes by arranging the said shanks or extensions of same to work within guide channels, grooves or their equivalent on the base plate or rest, whereby a parallel gripping action is obtained.

19,862 of 1902.—T. FISHER: *A Contrivance for the Ventilation of Works, Mills, and Manufactories.*

A contrivance for the ventilation of works, mills, and manufactories, characterised by a main steam pipe having branches which are provided with a multiplicity of jets or nozzles discharging into the chimneys of tin houses and other unhealthy departments of works and places, for increasing the current of air, in combination with valves for regulating the same and the means for removing the condensed water.

24,094 of 1902.—W. PERRY: *A Cement.*

A cement composition consisting of fifty to ninety parts of powdered iron, eight to thirty-five parts of plaster of Paris, two to fifteen parts of dextrine, five to twenty-five parts of ground glass, and half to five parts of a salt of sodium or potassium.

12,387 of 1903.—EMIL VON BUHLER and T. FRANKE: *Concrete Ceilings.*

In ceilings constructed of concrete slabs, or blocks an embedded iron bearer having three sides, the middle one of which serves as a base, and is of greater breadth or thickness, or both, than the other two converging sides.

12,388 of 1903.—EMIL VON BUHLER and T. FRANKE: *Combined Concrete and Iron Ceilings.*

A concrete and iron ceiling, in which the iron bearers enclosed therein consist of two webs meeting at an acute angle, one of said webs being horizontal for the purpose of preventing the separation of the concrete from the iron.

12,427 of 1903.—P. BRANDNER and C. MILLER: *Building Blocks.*

A building block provided with dovetail tongues and undercut grooves, and with correspondingly shaped and proportioned body partitions and perforations arranged in alignment with the tongues and grooves respectively.

12,519 of 1903.—O. W. MIRACLE and W. S. DOW: *Building Walls and Concrete Blocks for the Same.*

A building wall consisting of concrete blocks having a plurality of rows of vertical air cavities, the cavities of one row being opposite to and longer than the intervals between those of the other row, whereby they lap by the ends of the consecutive cavities of the other row, such blocks being assembled in the wall with their cavities registering one above the other in vertical succession to form continuous vertical cavities in the wall.

APPLICATION OPPOSED.

13,005 of 1902.—W. CALWAY: *Manufacture of Portable Buildings.*

This application, which covers an invention relating to the production of portable buildings by the use of tiles mounted within vertical frame members, was opposed by T. B. Provis on the ground of the prior patent granted to him (26,053 of 1901) in respect to the same invention. The hearing of the opposition took place on the 27th inst. before the Comptroller-General of Patents, when Mr. Edward Evans appeared on behalf of the opponent, and, after argument, the Comptroller-General gave judgment for the opponent, and refused the grant of the patent on the application of Calway, as he found that the invention was substantially the same as that in respect of which a patent had already been granted to T. B. Provis.

MEETINGS.

WEDNESDAY, AUGUST 5.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8. p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

July 14.—By SIMMONS & SONS (on the estate).

Silchester Common, Hants.—New-rd., &c., fourteen freehold building sites, 10a. 0r. 38p. (in lots) £1,037

July 15.—By BIDDELL & BLENCOWE (at Bury St. Edmunds).

Stradishall, Suffolk.—Seabrook's and Three Ashes Farms, 291a. 0r. 15p., f. 2,300
Mark's Farm, 65a. 3r. 9p., f. 500
Shop, house, malting land, &c., area 8a. 0r. 6p., f. 700
A small holding and lands, 24a. 0r. 13p., f. 310
Wickhambrook, Suffolk.—Peacock's and Brett's Farms, 182a. 0r. 23p., f. and c. 1,400
Attleton Green Farm, 117a. 3r. 11p., f. and c. 1,100
A small holding, 12a. 2r. 4p., f. and c. 340
Two freehold fields, 6a. 1r. 33p. 175
Hawkedon, &c., Suffolk.—The Windolfe's Farm, 142a. 0r. 21p., f. 1,100

By NOCK & JOSELAND (at Wolverhampton).

Codsall, Staffs.—Wheatstone Park Estate, 21a. 1r. 2p., f. 3,550
Wheatstone Cottage, and 10a. 3r. 38p., f. 1,200

By H. F. RUSSELL & Son (at Hereford).

Burghill, Hereford.—The Brick Kiln Farm, 309a. 0r. 17p., f. 8,500
Two enclosures, 10a. 3r. 18p., f. 440

July 16.—By GERMAN & GERMAN, with HAMPTON & SONS (at Derby).

Ilsley Walton, &c., Leicester.—The Ilsley Walton and Breedon estates of Baron Donington, 978 acres, f. (in numerous lots) 39,104

By BALLARD & MARSH (at Hampton).

Hampton Hill, Middx.—3 to 7, Wellington-gdns., u.t. 83¾ yrs., g.r. 15l., w.r. 149l. 10s. 1,010

By WINCH & SONS (at Maidstone).

Brenchley, Kent.—Chill Mill Farm and Bowling Alley Woods, 82a. 3r. 16p., f. 2,000
Burrs Mill Fields, 10a. 1r. 38p., f. 155
Brick Oast Field, 4a. 0r. 5p., f. 160
Two cottages and 0a. 0r. 20p., f. 275
Brattles Farm, 114a. 1r. 14p., f. 1,420
Curtis Farm, 112a. 3r. 31p., f. 1,450
Four enclosures, 14a. 1r. 5p., f. 300

July 17.—By WALTON & LEE (at Barnstaple).

Lynton, Devon.—Lower Ilkerton Farm, 50a. 1r. 19p., f. 1,650
Enclosures of land, 69a. 2r. 23p., f. 1,400

July 18.—By FENN & Co. (at Colchester).

Great Bromley, Essex.—Walnut Tree Farm, 7a. 3r. 32p., f. 430
Freehold house and 1a., y.r. 15l. 10s. 210

July 20.—By H. J. BROMLEY.

Forest Hill.—62, London-rd., f., p. 1,000
121 and 123, Sunderland-rd., u.t. 56 yrs. g.r. 18l., p. 645
144 and 146, Stanstead-rd., u.t. 73 yrs., g.r. 12l., p. 675
Sydenham.—70, Wells-rd., s., u.t. 71 yrs., g.r. 5l. 10s., q.r. 30s. 300

By T. H. CURRIE.

Notting Hill.—14 and 16, Farmer-st., u.t. 46 yrs., g.r. 10l., w.r. 92l. 6s. 660

By FURBERS'.

Hammersmith.—42, 44, and 46, Upper Mall, u.t. 76 yrs., g.r. 30l., y.r. 135l. 1,260
South Kensington.—4, Cathcart-rd., u.t. 45¼ yrs., g.r. 10l., y.r. 70l. 490
16 and 18, Cathcart-rd., u.t. 45¼ yrs., g.r. 20l., y.r. 130l. 1,030
3, Coleherne-rd., u.t. 60½ yrs., g.r. 12l. 10s., y.r. 70l. 490
22, Finborough-rd., u.t. 59½ yrs., g.r. 10l., y.r. 55l. 380
Surbiton, Surrey.—5, St. James's-rd., u.t. 57½ yrs., g.r. 10l., y.r. 60l. 410
19, St. Philip's-rd., u.t. 64 yrs., g.r. 12l., e.r. 6l. 370

By KEMSLEYS.

Buckhurst Hill, Essex.—High-rd., Ivy Cottage, f., y.r. 31l. 4s. 815

By J. C. PLATT.

Hammersmith.—110, 112, 112A, and 114, King-st., area 9,000 ft., c., y.r. 170l. 5,350
Brentford, Middx.—96, High-st., s., f., y.r. 40l. 600

By J. H. BETHELL (at Forest Gate).

West Ham.—Ladysmith-rd., &c., 39 plots of freehold building land (in lots) 1,376

July 21.—By DAVID BURNETT & Co.

Whitechapel.—8, Little Alie-st., u.t. 74 yrs., g.r. 16l. 10s., y.r. 100l. 1,300

By DEBENHAM, TEWSON, & Co.

Pall Mall.—No. 68 (New Oxford and Cambridge Club), area 3,800 ft., u.t. 49 yrs., g.r. 555l., y.r. 2,000l. 20,000
Aldgate.—Mansell-st., The George p.-h., f.g.r. 100l., reversion in 68½ yrs. 2,000

By FERRIS & PUCKRIDGE.

Southall, Middx.—Dormer's Well-lane, two freehold building sites, 0a. 2r. 20p. 505
Uxbridge-rd., a corner building site, 0a. 1r. 22p., f. 350
Havelock-rd., a freehold field, 1a. 2r. 31p. 500

By J. HAXELL.

City of London.—118 and 119, Cheapside, s., u.t. 18½ yrs., g.r. 250l., y.r. 950l. 5,502

By ALFRED RICHARDS.

Palmer's Green.—11, Palmer's Green-villas, f., p. 800

By COBBS (at Rochester).

New Brompton, Kent.—Wyles-st., the Bricklayers' Arms b.-h., f., u. 3,150
Cliffe, Kent.—Various enclosures, 11a. 3r. 35p., f. 340
Market garden ground, 6a. 2r. 27p., f. 230

By WALTER VINCENT (at Kilburn).

St. John's Wood.—1 to 7, Beckett's-pl., u.t. 14 yrs., g.r. 2l., w.r. 217l. 8s. 570
Kensal Rise.—12, Ravensworth-rd., u.t. 75½ yrs., g.r. 5l. 10s., w.r. 39l. 285

By JOSEPH STOWER (at Waltham Cross).

Cheshunt, Herts.—76 and 78, Cheshunt-st. and cottage in rear, area 1a. 0r. 38p., f., y.r. 45l. 1,100

July 22.—By COCKETT & HENDERSON.

Stratford.—24 to 30 (even), Blenheim-rd., f., w.r. 88l. 8s. 685

By E. HORNE.

Orpington, Kent.—Station-rd., freehold building land, area 4a. 1r. 20p. 1,475

By CURTIS & HENSON.

Esher, Surrey.—Milbourne-lane, Milburn and 47a. 0r. 30p., part f., and part u.t. 36 yrs., g.r. 315l. £24,800

By HUMBERT & FLINT.

Hockliffe, &c., Beds.—Hockliffe Grounds Estate, 201a. 3r. 8p., f. 5,000

By F. JOLLY & Co.

Stoke Newington.—47, Norcott-rd., u.t. 76 yrs., g.r. 7l., y.r. 33l. 405
Hackney.—4, Navarino-rd., u.t. 42 yrs., g.r. nil, e.r. 55l. 710

By RUSHWORTH & STEVENS.

Knightsbridge.—24 and 24a, Hill-st., u.t. 30½ yrs., g.r. 9l. 9s., y.r. 92l. 940
Tooting.—92 and 94, Longley-rd., f., y.r. 50l. 740

By F. VARLEY & Son.

Holloway.—56, Huddleston-rd., u.t. 64 yrs., g.r. 7l., e.r. 60l. 590
Stoke Newington.—24, 27, 28, and 29, Mildmay-st., u.t. 48 yrs., g.r. 16l. 16s., y.r. 126l. 1,215

By DOUGLAS YOUNG & Co.

Camberwell.—Coldharbour-la., Herbert House, f., p. 1,750
Galleywood End, Essex.—Moretons and 17a. 2r. 9p., f., y.r. 60l. 950
Balham.—75, Fernlea-rd., u.t. 70 yrs., g.r. 6l. 6s., e.r. 38l. 390
Bromley-by-Bow.—Epsom-st., f.g.r.'s 47l. 5s., reversion in 36 and 38 yrs. 1,210
Marner-st., f.g.r.'s 8l., reversion in 39 and 40 yrs. 2,000
St. Leonard's-st., f.g.r. 8l., reversion in 39 yrs. 200
Wandsworth.—Earlsfield-rd., f.g.r.'s 50l., reversion in 81 and 82 yrs. 1,400

By MADDISON, MILES, & MADDISON. (at Yarmouth).

Caister, Norfolk.—The White House, f., p. 840
Various enclosures, 55a. 2r. 12p., f. 1,810
Two freehold marshes, 10a. 3r. 15p. 400
Beach-road farm, 21a., f. 800
A small occupation, 0a. 2r. 15p., f. 200
A small holding, 1a., f. 245
Two enclosures, 4a. 1r. 3p., f. 510
Four freehold cottages 275

July 23.—By H. J. BLISS & Sons.

Bethnal Green.—39, 41, and 43, Vivian-rd., u.t. 60 yrs., g.r. 10l. 10s., w.r. 101l. 8s. 930
36, and 37, Pollard-st., f., y.r. 78l. 12s. 1,015

By J. H. BULMER.

Bermondsey.—53 and 74, Abbey-st., s., f., y.r. 68l. 10s. 1,240
385, Southwark Park-rd., u.t. 43¾ yrs., g.r. 5l. 5s., y.r. 32l. 310

By DEBENHAM, TEWSON, & Co.

Commercial-rd. East.—Nos. 510 and 512, f.g.r. 35l., reversion in 68 yrs. 800
New Cross.—New Cross-rd., f.g.r. 45l., reversion in 64 yrs. 1,400
Clapham.—Park-pl., f.g.r. 10l., reversion in 40 yrs. 280
Norwood.—Weaver's cottages, f.g.r. 14l. 18s., reversion in 13 yrs. 425
Holborn.—3, Kirby-st., f., y.r. 50l. 1,255
Gray's Inn-rd.—35, Sidmouth-st., s., f., y.r. 54l. 12s. 500
Shoreditch.—55 and 56, Charlotte-st., and 16, 17, and 18, Mills-court, f., w.r. 105l. 6s. 1,510
Spitalfields.—20, Buxton-st., f., w.r. 32l. 10s. 385
Wapping.—5, Little Hermitage-st., (s), and 4, Bushell-st., f., y.r. 45l. 655
New Cross.—5 and 7, Lewisham High-rd. (s), f., y.r. 72l. 1,035
Merton.—High-st., a plot of building land, f. 600
Peckham.—2, 4, and 6, Peckham-gr., u.t. 28 yrs., g.r. 10l., q.r. 96l. 600
22, 24, and 26a, Gloucester-rd., u.t. 23 yrs., g.r. 8l., w.r. 93l. 12s. 450
49 and 51, Coleman-rd., u.t. 28 yrs., g.r. 7l., w.r. 78l. 460
Hampstead.—1, 2, and 3, Elm-rd. cottages, u.t. 36 yrs., g.r. 3l., w.r. 62l. 8s. 330

By HARRODS'.

Weybridge, Surrey.—Portmore-pk.-rd., Rosebank and ¼ of an acre, f., p. 2,000

By MARGETTS & TOWNLEY.

Pinner, Middx.—Main-rd., the Dingle and 8a. 3r. 13p., f., p. 3,750

By NEWSON, EDWARDS, & SHEPHARD.

Holloway.—188 and 188a, Seven Sisters-rd. (s), f., y.r. 150l. 2,540
Stoke Newington.—89, Green-lanes (s), u.t. 78 yrs., g.r. 15l., e.r. 50l. 300
Stamford Hill.—82, Darenth-rd., u.t. 78¼ yrs., g.r. 20l., e.r. 81l. 950
Holloway.—53, Hilldrop-crescent, u.t. 47 yrs., g.r. 9l., e.r. 65l. 650

By F. SWAIN.

Edgware-rd.—No. 148, s., u.t. 7 yrs., g.r. 10l., y.r. 200l. 1,040
Notting Hill.—Ladbroke-ter., peppercorn g.r., reversion in 19 yrs. 780

By STIMSON & SONS.

Stockwell.—Burnley-rd., f.g. rents, 45l. 10s., reversion in 39 yrs. 1,275
Camberwell.—28, Crown-st., u.t. 62 yrs., g.r. 5l., e.r. 35l. 220
Peckham.—43, Reedham-st., s., u.t. 73½ yrs., g.r. 7l. 10s., y.r. 40l. 250
Old Kent-rd.—16, 18, 20, and 22, Haymerle-rd., u.t. 65 yrs., g.r. 25l. 4s., w.r. 156l. 830
Kennington.—18, Gilbert-rd., u.t. 24 yrs., g.r. 4l., increasing to 6l.; y.r. 28l. 250
Homerton.—10, Isabella-rd., u.t. 48½ yrs., g.r. 3l. 10s., w.r. 33l. 12s. 295
Holloway.—4, Hertslet-rd., u.t. 57½ yrs., g.r. 6l., y.r. 32l. 310
Finchley.—Alexander-grove, six freehold residences (named), y.r. 237l. 10s. 3,680

By J. A. & W. THARP.

Leytonstone.—33, Ferndale-rd., f., y.r. 31l. 4s. 330

By FAREBROTHER, ELLIS & Co.

Hornsey Rise.—Upper Hornsey Rise, a building site, 0a. 3r. 28p., f. 2,000
Upper Hornsey Rise, The Lodge, and the mews area 0a. 1r. 20p., f., y.r. 101l.; also f.g.r. 10l., reversion in 63 yrs. 2,250

Hornsey Rise.—Shaftesbury-rd., f.g.r.'s 23*l.* 7*s.*, reversion in 73 yrs. £580
Hampstead.—5 and 6, New End-sq., area 3,000 ft., f., y.r. 28*l.* 850
Kensington.—98 to 104 (even), 108, 110, and 112, Holland-rd., f., y.r. 375*l.* 8,810
Soho.—10, Greek-st., s., area 760 ft., f., y.r. 80*l.* 2,150
Holborn.—Nos. 126 and 127, f.g.r. 245*l.*, reversion in 75 yrs. 8,100
City of London.—22, Farringdon-st. (Wheatsheaf Coffee Rooms), f., y.r. 150*l.* 3,900
Farringdon-st., f.g.r. 30*l.*, reversion in 27 yrs... 1,380
Cranford, Middlesex.—Bath-rd., a copyhold holding, 4 a. 1 r. 18 p., y.r. 10*l.* 300

July 24.—By Browett & Taylor.

Acton.—24, Rosemont-rd., u.t. 74 yrs., g.r. 14*l.* 14*s.*, y.r. 55*l.* 580

By C. Rawlev Cross & Co.

Shepherd's Bush.—6 and 8, Old Oak-rd., u.t. 78½ yrs., g.r. 15*l.*, y.r. 90*l.* 900
Ealing.—41, Coldershaw-rd., u.t. 988 yrs., g.r. 3*l.* 5*s.*, y.r. 30*l.* 320
Kensington.—25, St. Mark's-rd., u.t. 62 yrs., g.r. 9*l.*, e.r. 55*l.* 375
Shepherd's Bush.—147, Uxbridge-rd., u.t. 60 yrs., g.r. 7*l.*, e.r. 62*l.* 550

By Dolman & Pearce.

Regent's Pk.—31, Gloucester-rd., u.t. 41 yrs., g.r. 12*l.*, p. 895

By Moss & Jameson.

Lewisham.—1, Beacon-rd., f., p., and 207, Hithergreen-lane, f., y.r. 40*l.* 1,900
Brompton.—101, Lillie-rd., s., f., e.r. 45*l.* 530
Fulham.—12 and 12A, Kingwood-ter., u.t. 95 yrs., g.r. 8*l.*, y.r. 75*l.* 8*s.* 525

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 15 6	per 1,000 alongside, in river.
Rough Stocks and Grizzles.....	1 12 6	" " "
Facing Stocks....	2 12 0	" " "
Shippers	2 5 0	" " "
Flettons	1 8 6	" at railway depôt
Red Wire Cuts ..	1 12 6	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire ..	4 5 0	" " "
Do. Bullnose	4 11 0	" " "
Best Stourbridge Fire Bricks	4 8 0	" " "
Glazed Bricks.		
Best White and Ivory Glazed Stretchers.....	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats.....	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers..	16 0 0	" " "
One Side and two Ends.....	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamfered, Squints.....	20 0 0	" " "
Best Dipped Salt Glazed Stretchers and Headers	12 0 0	" " "
Quoins, Bullnose, and Flats.....	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers..	14 0 0	" " "
One Side and two Ends.....	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays Chamfered, Squints.....	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	6 0	per yard, delivered.
Thames Ballast	6 0	" "
Best Portland Cement	30 0	per ton, delivered.
Best Ground Blue Lias Lime..	20 6	" "

Note.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	11s 6d. per yard, delivered.
Stourbridge Fire-clay in sacks	27s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
Bath Stone—delivered on road waggons, Paddington depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms depôt	1 8½	" "
Portland Stone (20 ft. average)—		
Brown Whitbed, delivered on road waggons, Paddington depot, Nine Elms depot, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington depot, Nine Elms depot, or Pimlico Wharf....	2 2½	" "

PRICES CURRENT (*Continued*).

STONE.

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld rly. depôt.
Beer in blocks	1 6	" "
Grinshill "	1 10	" "
Darley Dale in blocks..	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "
York Stone—*Robin Hood Quality.*	s. d.	
Scappled random blocks	2 10	per ft. cube, deld. rly. depôt.
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per foot super. "
6 in. Rubbed two sides Ditto, Ditto	2 6	" "
3 in. Sawn two sides slabs (random sizes)..	0 11½	" "
2 in. to 2½ in. Sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
Best Hard York—		
Scappled random blocks	3 0	per ft. cube "
6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	2 8	per ft. super. "
6 in. Rubbed two sides Ditto	—	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags.....	0 5	" "
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt
" " " 3 in. do.	1 2½	" "

SLATES.

in. in.	£ s. d.	
20×10 best blue Bangor..	13 2 6	per 1000 or 1200 at ry.dep.
20×12 " " " ..	13 17 6	" "
20×10 best seconds "	12 15 0	" "
20×12 " " "	13 10 0	" "
16× 8 best "	7 0 0	" "
20×10 best blue Portmadoc	12 5 0	" "
16×8 best blue Portmadoc	6 5 0	" "
20×10 best Eureka unfading green....	15 2 6	" "
20×12 " "	17 2 6	" "
18×10 " "	12 10 0	" "
16× 8 " "	10 5 0	" "
20×10 permanent green	11 0 0	" "
18×10 " "	9 5 0	" "
16× 8 " "	6 10 0	" "

TILES.

	s. d.	
Best plain red roofing tiles..	42 0	per 1,000, at rly. depôt.
Hip and valley tiles....	3 7	per doz. " "
Best Broseley tiles	50 0	per 1,000 " "
Do. Ornamental Tiles	52 6	" " "
Hip and valley tiles....	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles.....	3 0	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	51 9	per 1,000 " "
Do. Ornamental Do.	54 6	" " "
Hip tiles	4 1	per doz. " "
Valley tiles.....	3 8	" " "
Best "Rosemary" brand plain tiles	48 0	per 1,000 " "
Do. Ornamental Do.	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 8	" " "

WOOD.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.....	15 10 0	16 10 0
Deals: best 3 by 9.....	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.....	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
2 in. by 4 in. and 2 in. by 6 in. ..	9 0 0	
2 in. by 4½ in. and 2 in. by 5 in. ..	8 10 0	9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
⅞ in.	1 0 0	"
Fir timber: Best middling Danzig or Memel (average specification	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Small timber (6 in. to 8 in.).....	3 0 0	3 10 0
Swedish balks	2 15 0	3 0 0
Pitch-pine timber (30 ft. average)..	3 5 0	3 15 0
Joiners' Wood.		
White Sea: First yellow deals, 3 in. by 11 in.....	At per Standard. 23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in.	18 10 0	20 0 0
" " 3 in. by 9 in.	17 10 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.....	18 0 0	19 10 0
Battens.....	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.....	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens.....	11 0 0	12 10 0
Third yellow deals, 3 in. by 11 in.....	13 10 0	14 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 0 0	11 0 0

PRICES CURRENT (*Continued*).

WOOD.

	At per standard. £ s. d.	£ s. d.
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" " 3 in. by 9 in.	13 10 0	14 10 0
Battens.....	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
" " " 3 in. by 9 in.	12 10 0	13 10 0
" " " battens.....	9 10 0	10 10 0
Pitch-pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes ..	33 0 0	upwards.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube..	0 3 6	0 4 6
Danzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 3 6
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube ..	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
⅞ in. do. do.	0 0 6½	. . .
Dry Mahogany—Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	17 0 0	21 0 0
American Whitewood Planks—		
Per ft. cube	0 4 0	. .

Prepared Flooring—	Per square.	
1 in. by 7 in. yellow, planed and shot.....	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched.....	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched.....	0 16 0	1 1 6
1 in. by 7 in. white, planed and shot.....	0 11 6	0 13 6
1 in. by 7 in. white, planed and matched.....	0 12 0	0 14 0
1¼ in. by 7 in. white, planed and matched.....	0 14 6	0 16 6
⅞ in. by 7 inch yellow matched and beaded or V-jointed boards	0 11 0	0 13 6
1 in. by 7 in. do. do. do.	0 14 0	0 18 0
⅞ in. by 7 in. white do. do.	0 10 0	0 11 6
1 in. by 7 in. do. do. do.	0 11 6	0 13 6

6-in. at 6d. to 9d. per square less than 7-in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0
Compound Girders " "	8 2 6	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Flitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 6

METALS.

	Per ton, in London. £ s. d.	£ s. d.
Iron—		
Common Bars.....	7 10 0	8 0 0
Staffordshire Crown Bars, good merchant quality	8 0 0	8 10 0
Staffordshire "Marked Bars" ..	10 10 0	. . .
Mild Steel Bars	8 15 0	9 5 0
Hoop Iron, basis price.....	9 0 0	9 5 0
" " galvanised.....	16 0 0	. .
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	9 15 0	. . .
" " to 24 g.	10 15 0	. . .
" " to 26 g.	12 5 0	. . .
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.....	12 15 0	. . .
" " 22 g. and 24 g.	13 5 0	. . .
" " 26 g.....	14 5 0	. . .
Sheet Iron, Galvanised, flat, best quality:—		
Ordinary sizes to 20 g.....	16 0 0	. . .
" " 22 g. and 24 g.	16 10 0	. . .
" " 26 g.....	18 0 0	. . .
Galvanised Corrugated Sheets:—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	. . .
" " 22 g. and 24 g.	13 5 0	. . .
" " 26 g.....	14 0 0	. . .
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker ..	11 15 0	. . .
" " 22 g. and 24 g.	12 15 0	. . .
" " 26 g.	14 0 0	. . .
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0

(Under 3 in. usual trade extras.)

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
Lead—Sheet, English, 3 lbs. & up.	14 5 0	. . .
Pipe in coils	14 15 0	. . .
Soil pipe	17 5 0	. . .
Compo Pipe	17 5 0	. . .
Zinc—Sheet—		
Vieille Montagne ..... ton	26 5 0	. . .
Silesian	26 0 0	. .
Copper—		
Strong Sheet ..... per lb.	0 0 10½	. . .
Thin ..... "	0 0 11½	. . .
Copper nails ..... "	0 0 11	. . .
Brass—		
Strong Sheet..... "	0 0 10	. . .
Thin " ..... "	0 0 11	. . .
Tin—English Ingots ..... "	0 1 4	. . .
Solder—Plumbers' ..... "	0 0 6	. .
Tinmen's ..... "	0 0 8	
Blowpipe ..... "	0 0 9	

PRICES CURRENT (*Continued*).

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft.	delivered.
fourths	2¾d.	"
21 oz. thirds	3¼d.	"
fourths	3½d.	"
26 oz. thirds	3¾d.	"
fourths	4d.	"
32 oz. thirds	4½d.	"
fourths	5d.	"
Fluted sheet, 15 oz.	3d.	"
21 oz.	4d.	"
½ Harley's Rolled Plate	1¾d.	"
½ " " "	2d.	"
¾ " " "	2½d.	"

OILS, &c.		£	s.	d.
Raw Linseed Oil in pipes or barrels..	per gallon	0	1	11
" " in drums	"	0	2	3
Boiled " " in pipes or barrels..	"	0	2	2
" " in drums	"	0	2	6
Turpentine, in barrels	"	0	3	2
" in drums	"	0	3	4
Genuine Ground English White Lead	per ton	20	0	0
Red Lead, Dry	"	20	0	0
Best Linseed Oil Putty	per cwt.	0	2	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for Seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TO CORRESPONDENTS.

J. S. M. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communicatfoas (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to J. MORGAN) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers) can ensure receiving "The Builder" by *Friday Morning's Post.*

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BEESTON.—For alterations and re-seating Baptist Chapel, Beeston. Messrs. A. R. Calvert & William R. Gleave, architects, Nottingham:—

W. Crane, Ltd.*	£154 18

BRIGHTON.—For the erection of eight artisans' dwellings, Elm-grove, for the Town Council. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

William Taylor	£3,900	J. & W. Simmonds, Brighton*	£2,552
H. A. Carton Jay	3,600		
Sattin & Evershed	3,592	Thomas Whittier ‡	2,246

‡ Withdrawn.

CADOXTON.—For the erection of a new branch reading-room at the Common-road, Cadoxton, for the Barry Urban District Council. Messrs. Speir & Beavan, architects and quantity surveyors:—

H. S. Rendell	£1,075	Gibby & Cleak	£1,025
Henry Fisher	1,068	John Evans‡	945

‡ Recommended for acceptance.

CATERHAM.—For the supply and fixing of hot-water and heating services at Caterham Asylum, for the Metropolitan Asylums Board:—

Tamplin & Makovski, Ltd.	£368 12 6
Samuel Mason, Ltd.	360 19 6
Simpson & Co., Ltd.	335 0 0
Brightside Foundry and Engineering Co., Ltd.	328 0 0
Wenham & Waters	275 0 0
W. J. Millington	268 0 0
Werner, Pfleider, & Perkins, Ltd.	257 0 0
Joel & Co. and Potter & Sons United, Ltd.	248 0 0
Thos. Cole	245 0 0
Beaven & Sons	239 10 0
J. & F. May	228 0 0
Rosser & Russell, Ltd.*	221 0 0
Lancashire Heating Co.	182 0 0

[Engineer's estimate, £300.]

HEMEL HEMPSTEAD.—For repairs to the Lawn, Hemel Hempstead, Herts. Mr. Arthur F. Briggs, architect, 9, Queen Victoria-street, E.C.:—

Miskin & Sons	£925 0 0	J. Darvill	£380 0 0
Mansfield & Son	580 6 6	J. Hales	397 0 0

LEAVESDEN ASYLUM.—For the supply and fixing of hot-water and gas services at the Leavesden Asylum, for the Metropolitan Asylums Board:—

Tamplin & Makovski, Ltd.	£1,194 2 6
Simpson & Co., Ltd.	1,065 0 0
Samuel Mason, Ltd.	1,045 9 4
Wenham & Waters, Ltd.	898 0 0
W. J. Millington	893 0 0
Brightside Foundry and Engineering Co., Ltd.	813 0 0
Joel & Co. & Potter & Sons United, Ltd.	755 0 0
Beaven & Sons	701 5 0
Davey & Roberts	699 0 0
Lancashire Heating Co.	640 0 0
Rosser & Russell, Ltd.	665 0 0
Werner, Pfleider, & Perkins, Ltd.	618 0 0
J. & F. May, Lincoln's Inn Fields, W.C.*	610 0 0
Wood & Sons (withdrawn)	580 0 0

[Engineer's estimate, £720.]

LONDON.—For additions and alterations to No. 26, London-road, Forest Hill, S.E. Mr. J. Randall Vining, architect and surveyor, 89, Chancery-lane, W.C.:—

Black & Son	£1,700	A. W. Coombs	£1,569
Turtle & Appleton	1,653	Smith & Sons	1,535
J. & C. Bowyer	1,637	Roberts & Co.*	1,510
A. Sykes	1,578		

LONDON.—For three additional stories to warehouse, Kingsland, N. Mr. J. Randall Vining, architect and surveyor, 89, Chancery-lane, W.C.:—

Marsland & Sons	£2,938	Cormick & Sons	£2,819
Perry & Co.	2,900	C. Wall	2,671
Clark & Monnooch	2,887	Black & Son	2,637
J. & C. Bowyer	2,825	Turtle & Appleton*	2,497

LONDON.—For new staircase and alterations to No. 92, Fenchurch-street, E.C. Mr. Arthur F. Briggs, architect, 9, Queen Victoria-street, E.C.:—

Patman & Fotheringham	£1,400	Mansfield & Son	£1,315
Turnbull & Son	1,350	Greenwood & Co.	1,141
		Ashby & Horner*	1,047

LONDON.—For paving, with Australian hardwood, the carriageway of Tudor-street (Temple-avenue to New Bridge-street), for the Corporation of the City of London:—

Improved Wood Paving Co.*	£1,707 19 2

LONDON.—For the work of excavating and levelling the site of the New Cross car-shed, for the L.C.C.:—

A. Hopkins‡	£13,775 0 0
M. Dinnie	8,678 2 0
Pethick Bros.	8,659 19 3
Martin, Wells, & Co., Ltd.	8,208 0 0
J. & M. Patrick, London*	6,541 0 0

‡ Less credit allowance of £50 10s. for trees removed.

LONDON.—For the construction of a pier, river-wall, and water-condensing pipes, in connexion with the electricity generating-station to be established by the County Council at Greenwich for the electrical working of some sections of its tramways:—

Fasey & Son	£52,939 18 1
Cochrane & Sons, London*	55,558 19 9
Squire & Co.	57,340 1 3
Pethick Bros.	63,165 8 0
Alfred Thorne	£4,341 8 11
The Sir Hiram Maxim Electrical and Engineering Co., Ltd.	65,100 14 10
Pedrette & Co.	89,355 16 3

[Messrs. John Cochrane & Sons to sublet the following portions of the work in connexion with the construction of the pier and other works to the undermentioned firms (or to such other firms as may be approved by the Engineer under the contract), namely (1) to Messrs. Joseph Westwood & Co., the manufacture of the wrought iron and steel work; and (2) to Messrs. Cochrane & Co., the manufacture of the cast-iron cylinders and pipes.]

LONDON.—For the supply, delivery, and erection of the steelwork for the first portion of the Greenwich electricity generating-station, for the L.C.C.:—

The Fulham Steel Works Co., Ltd.	£45,297 0 0 37,100 0 0‡
The Horseley Co., Ltd.	41,517 6 5
Dorman, Long, & Co., Ltd.	39,831 7 4
Westwood & Co., Ltd., Millwall*	36,808 14 6

‡ Alternative tender not to specification.

[The contract to be given to Messrs. Dorman, Long, & Co. if satisfactory terms and conditions cannot be arranged with Messrs. Westwood & Co.]

LONDON. — For hydrant indicator-tablets, for the L.C.C.:—

Pontifex & Co., for the supply and fixing of not more than 1,000 hydrant indicator-tablets. Estimated expenditure	£120

LONDON.—For electric light and electric bell installations at the Rotherhithe-street fire-station, for the L.C.C.:—

Alliance Electrical Co., Ltd.	£233 8 6
Glover & Co., Ltd.	221 5 0
Leo Sunderland & Co.	221 0 0
A. H. Marshall	220 0 0
Coleby & Co.	220 0 0
Oliver Clark & Co.*	211 0 0

LONDON.—For hot-water apparatus, Whitechapel fire-station, for the L.C.C.:—

Kinnell & Co., Ltd.	£250 0 0
John Jeffreys	248 0 0
F. & H. F. Higgs	230 0 0
F. & F. J. Wood	219 0 0
G. & E. Bradley	207 0 0
Werner, Pfleiderer, & Perkins, Ltd.*	178 12 6

LONDON.—For repaving the carriageway of Albert Bridge for the London County Council:—

Martin, Wells & Co., Ltd.	£1,855 0 0	Acme Wood Flooring Co., Ltd.	£998 3 4
Mowlem & Co., Ltd.	1,345 0 0	Griffiths & Co., Ltd.*	936 6 8
Improved Wood Pavement Co., Ltd.	1,086 10 0		

LONDON.—Running contracts for the supply of various articles of furniture (for the School Board for London):—

	Cupboards. No. 2. each.	Cupboards. No. 5. each.	Tables. (3 ft. 6 in. by 2 ft. 6 in.) each.	Adjustable Drawing Desks. each.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
H. Bouneau	6 18 6	8 19 0	†2 12 6	1 17 0
Brake & Co.	—	10 18 6	—	—
J. Cox	—	†6 10 0	—	—
T. Cruwys	†6 5 0	9 10 0	—	2 9 0
A. Duncan	6 7 0	—	1 15 0	—
Educational Supply Association, Ltd.	7 10 8	9 9 0	1 15 6	†2 12 0
Galbraith Bros.	—	8 3 4	—	—
Garvie & Sons	—	11 8 0	—	—
General Builders, Ltd.	10 17 6	—	—	—
Golding & Ansell	9 10 0	—	—	—
Goodall, Lamb, & Heighway, Ltd.	6 15 0	—	2 2 0	—
Hammer & Co., Ltd.	7 15 0	9 0 0	1 15 0	1 17 0
Harrod's, Ltd.	12 10 0	12 0 0	—	—
Lascelles & Co.	9 15 6	—	2 2 0	—
London School Furniture Co.	7 10 0	7 0 0	—	1 16 5
Marchant & Hirst	7 5 0	—	2 0 0	—
Mason & Sons	8 3 6	—	—	—
North of England School Furnishing Co., Ltd.	7 17 10	9 14 4	—	1 14 4
Parkstone Steam Joinery Co.	10 0 0	—	—	—
T. R. Roberts, Ltd.	16 4 4	27 16 9	—	—
Shoolbred & Co.	12 12 0	—	3 15 0	—
Spence & Sons	8 8 0	—	—	—
Spencer & Co.	13 0 0	—	—	—
Wallis & Co., Ltd.	6 19 8	—	2 1 0	—
Waring & Sons, Ltd.	6 17 6	—	1 18 6	—
Wrinch & Sons	10 19 0	10 10 0	—	—

[*See also page 149.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
Gates and Fencing, Rothwell, Haigh	Hunslet (near Leeds) Guardians	Not stated	Aug. 5
Offices, Selton and Dixon-streets	Blackpool Corporation	Not stated	Aug. 31
Sewerage Works	Howden (Yorks) R.D.C.	15*l.*	Sep. 12
*Library Building	Borough of Heywood	30*l.*, 20*l.*, and 10*l.*	Sep. 14
Machinery for Lifting Boats	Austrian Government	100,000 Kronen, 75,000 Kronen, and 50,000 Kronen	Mar. 3, 1904
*Plans for a New School	Gillingham U.D.C. Education Com.	Not stated	No date.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., supplied by	Tenders to be delivered
Cast Iron Water Piping	Glasgow Corporation	J. Lindsay, City Chambers, Glasgow	Aug. 3
Additions to Dyon School, Distington	The Managers	H. Hill, Dyon Side, Distington	do.
Cemetery Works	East Kilbride Parish Council	J. Cowan, Civil Engineer, 179, West George-street, Glasgow	do.
Additions to Police Station Buildings, Ludgershall	Wilts County Council	C. S. Adye, County Surveyor, County Offices, Trowbridge	do.
Building Works at Asylum, Murthly, Perth	.....	S. Smart, Architect, Perth	do.
Mission Hall, Northwich	.....	E. T. Ward, Winnington-street, Northwich	Aug. 3
Alterations to No. 29, The Parade	.....	G. Thomas, Architect, Queen's Chambers, Cardiff	do.
Well Sinking, Wooden Mill	Kelso Town Council	W. R. Copland, Civil Engineer, 146, West Regent-street, Glasgow	do.
Warehouse, Page Stair-lane, King's Lynn	Mr. H. J. Finch	H. Tilson, Architect, Railway-road, Lynn	do.
Business Premises, Bishop-street, Londonderry	Mr. Ed. McGunnis	J. P. McGrath, Architect, Foyle-street, Londonderry	do.
Gas Mains (3½ miles) Contract 3	Cudworth U.D.C.	W. ... son, Civil Engineer, Pontefract-road, Barnsley	do.
Paving Works	Salford Corporation	Borough Engineer, Town Hall, Salford	do.
Widening Bridge, Lower Cambridge-street	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
*Wrought Iron Fencing, Recreation Ground, Queens-rd.	Hendon U.D.C.	Engineer to the Council, Council Offices, Hendon, N.W.	do.
Station Buildings, Penshaw	N. E. R. Company	W. Bell, Architect, Central Station, Newcastle-on-Tyne	Aug.
Three Cottages, Sleights (Yorks)	do.	W. Bell, Architect, N. E. R. Co.'s Offices, York	do.
Foundations, &c., at Electricity Works	Warrington Corporation	Borough Engineer, Town Hall, Warrington	do.
Sewers, &c., Brickhouse-lane and other roads	West Bromwich Town Council	A. D. Greatorex, Civil Engineer, Town Hall, West Bromwich	do.
Street Works, Chestergate	Macclesfield Corporation	Borough Engineer, Town Hall, Macclesfield	do.
Reservoir, Kirkella	Hull Corporation	F. J. Bancroft, Engineer, Town Hall, Hull	do.
Boundary Walls, Forge-lane, Bradford	Manchester Corporation	City Surveyor, Town Hall, Manchester	do.
House, Bowness-in-Windermere	Miss Sinkinson	J. P. Curwen, Architect, 26, Highgate, Kendal	do.
*Painting, &c., Dining Halls at Renfrew-rd. Workhouse	Parish of Lambeth	Clerk to Guardians, Board Room & Offices, Brook-st., Kennington	do.
Schools, Rhostyllen	Bersham U.D. School Board	T. Morris, Architect, 7, Argyle-street, Wrexham	Aug. 6
Additions to House and Offices, St. Agnes	....	S. Hill, Architect, Green-lane, Redruth	do.
Road Works, Couchmore Estate, Thames Ditton	.....	C. & F. Rutley, Surveyors, 11, Dowgate-hill, E.C.	do.
Alterations, &c., at Asylum, Armagh	The Committee of Management	R. H. Dorman, County Surveyor, Armagh	do.
Vestry, &c., Ballee Church, Downpatrick	The Wardens	The Rector, The Rectory, Ballee, Downpatrick	do.
Road Works, Station-road	Wealdstone U.D.C.	H. Walker, Civil Engineer, Council Offices, Wealdstone	do.
Chapel, Ynysybwl	The Wesleyans	A. O. Evans, Architect, Pontypridd	do.
Broken Granite Road Metal (2,000 tons)	Portland U.D.C.	R. S. Henshaw, Engineer, New-road, Portland	do.
Road Works, Gladstone-place, Aberdeen	The Land Association, Ltd.	Walker Duncan, Civil Engineer, Aberdeen	do.
House, Bargate, Grimsby	.....	H. C. Scaping, Architect, Court Chambers, Grimsby	Aug. 7
Timber Jetty	Burntisland (N.B.) Harbour Comrs.	R. Henderson, Civil Engineer, High-street, Burntisland	do.
Chapel, Embleton	The Wesleyans	—. Allinson, Esq., Bassenthwaite Lake Station, Embleton	do.
Police Station, &c.	Faversham Town Council	County Surveyor, 86, Week-street, Maidstone	do.
Road Works at Hospital, Chickenley Wood	Dewsbury Hospital Board	Holtom & Fox, Architect, Dewsbury	do.
Additions &c., to Works, Scotswood, near Benwell	Messrs. Gibson & Co.	W. P. Pattison, Surveyor, Council Offices, Benwell	do.
Reservoir	Cromer (Norfolk) U.D.C.	J. C. Mellis, Civil Engineer, Town Hall, Cromer	do.
*Police Station, Cottages, &c.	Kent County Council	County Surveyor, 86, Week-street, Maidstone	do.
*New Coastguard Buildings at Cemaes	The Admiralty	Works Department, Admiralty, 21, Northumberland-avenue	do.
House, Fermoy, Ireland	.....	W. H. Hill & Sons, Architects, 28, South Mall, Cork	Aug. 8
Additions, &c. to Cottage Hospital	.....	J. W. Grundy & Son, Architects, Brogden-street, Ulverston	do.
Paving Works, Great Meadow	Dillisham Parish Council	J. Hellyer, Council Offices, Dittisham	do.
Water Supply Works	Boyle (Ireland) No 1 R.D.C.	J. H. M. Swiney, Civil Engineer, Avenue Chambers, Belfast	do.
Cold Air Store at Town Hall	Accrington Corporation	A. H. Aitken, Town Hall, Accrington	do.
Street Improvement Works, Jersey-road, Blaengwynfi	Glyncorrwg U.D.C.	W. P. Jones, Architect, Cymmer, Port Talbot	do.
Farm Buildings, Gwinear	Mr. J. S. Spry	S. Hill, Architect, Green-lane, Redruth	Aug. 9
Vicarage, Tyne Dock, Sunderland	Rev. L. P. Williams	J. Potts & Sons, Architects, 57, John-street, Sunderland	Aug. 10
Rebuilding Bridge, New-in-Pendle, Preston	Lancs County Council	W. C. Hall, County Offices, Preston	do.
Forty Houses, Pontnewynydd	Grove Estate Building Club	Fisher & Sons, Architects, Club Chambers, Pontypool	do.
Bridge Works, Waterleat	Ashburton U.D.C.	R. E. Tucker, Council Offices, Ashburton	do.
Granite Road Metal (1,800 tons)	Hitchin U.D.C.	Surveyor, Council Offices, Hitchin	do.
School Buildings, Lanehead-lane	Bacup Corporation	Smith & Cross, Architects, Town Hall Chambers, Rochdale	Aug. 12
*New Depot, &c. in Church-street	U.D.C. of Epsom	Surveyor, Council Offices, Bromley Hurst, Epsom	Aug. 15
*2½ miles Sewers, &c.	Wilton R.D.C.	Lemon & Blizzard, 38, Silver-street, Salisbury	Aug. 17
Bacteria Beds	Birmingham Corporation	J. D. Watson, Engineer, Tyburn, near Birmingham	do.
Sewage Disposal Works, Lyndhurst	New Forest R.D.C.	Bennett, Son & Berry, Engineers, Midland Bank Chmbrs, Southmptn.	Aug. 18
*New Post Office at Ilford	H.M. Works	The Secretary, H.M. Office of Works, Storey's Gate, S.W.	do.
*Foundations of 10th County Lunatic Asylum (Epsom)	L.C.C. Asylums Committee	Clerk to the Committee, 6, Waterloo-place, S.W.	Aug. 20
*Enlargement of Post Office, Leicester	H.M. Office of Works	Secretary, H.M. Office of Works, Storey's Gate, S.W.	Aug. 26
Graving Dock, Belfast	Harbour Commissioners	C. F. L. Giles, Engineer, Harbour Offices, Belfast	Aug. 31
Business Premises, Brighton	Handsworth Woodhouse, Indus. Soc.	G. Platts, Central Stores, Woodhouse	No date.
Rebuilding the Elephant and Castle Hotel, Westgate	.....	J. Jackson, Architect, Barry-street, Bradford	do.
Infirmary Buildings	Bridgend Guardians	P. J. Thomas, Architect, Bridgend	do.
Engine House, Ravenscliffe Mill, Calverly	....	Kendall & Bakes, Architects, Victoria-square, Leeds	do.
Wrought-iron Pipes, Risca Colliery, Monmouthshire	.....	Secretary, United National Collieries, Ltd., 30, Exchange, Cardiff	do.
Five Houses and Shops, Harehills-lane, Leeds	Mr. Fred Terry	W. M. Coggill, Architect, Stourton, Hunslet	do.
School Buildings, Sneinton, Boulevard	Nottingham School Board	F. B. Lewis, Architect, Guildhall, Nottingham	do.
Fifteen Houses, Hemsworth, near Wakefield	.....	Jas. Simmons, Hague-lane, Hemsworth	do.
*New School, Seedley, Salford	Salford Education Committee	Town Clerk, Town Hall, Salford	do.
*Detached Residence at St. Osyth	Mrs. F. J. Flower	George Gardiner, 11, Marine-parade, Clacton-on-Sea	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Lecturer	South-Eastern Agricultural College	100*l.* per annum	Aug. 20
*Draughtsman	Capetown Corporation	300*l.* per annum	No date.

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, iv. *Contracts*, iv. vi. viii. x. & xi. *Public Appointments*, xviii.

TENDERS (*Continued*) :—

LONDON.—Running contracts for the supply of various articles of furniture, &c. (for the School Board for London) :—

	Boards (interior notice).	Boards (not blacked). 48in. by 36in.	Boards (not blacked). 42in. by 30in.	Boards (not blacked). 36in. by 30in.	Boards (not blacked). 60in. by 42in.	Art easels.	Stools. Modelling.	Stools. Laundry.	Moveable Screens. For Flat Floors.	Moveable Screens. For Stepped Floors.	Portable Science Table Tops.
	Each. s. d.	Per 100. £ s. d.	Per 100. £ s. d.	Per 100. £ s. d.	Per doz. £ s. d.	each s. d.	per doz. £ s. d.	per doz. £ s. d.	per ft. run. £ s. d.	per ft. run. £ s. d.	each. £ s. d.
Barnard & Son	—	—	—	—	—	—	—	—	—	—	—
H. Bouneau	6 8	52 0 0	41 0 0	35 0 0	9 19 6	†3 11	6 10 0	6 12 0	0 11 0	0 12 3	—
Brake & Co.	11 6	49 10 0	38 10 0	35 15 0	—	—	—	—	—	—	—
T. Cruwys	—	—	—	—	—	—	—	—	—	—	—
Educational Supply Association, Ltd.	8 0	†40 0 0	†30 0 0	†26 12 0	—	0 6	6 0 0	9 0 0	to 9 6	to 10 6	1 10 0
Galbraith Bros.	—	—	—	—	—	8 0	6 3 0	8 0 0	0 11 6	0 12 6	—
Garvie & Sons	—	—	—	—	—	—	—	—	—	—	—
General Builders, Ltd.	—	—	—	—	—	—	—	—	—	—	1 16 0
Gloucester Joinery Co., Ltd.	—	—	—	—	—	14 11	9 18 0	8 14 11	—	—	—
Golding & Assell	6 6	50 0 0	37 10 0	31 5 0	8 14 0	—	—	—	—	—	2 9 6
Goodall, Lamb, & Heighway, Ltd.	*5 4	57 10 0	40 0 0	37 10 0	8 14 0	—	—	—	15s. per ft. run not less than 7 ft.	—	—
Hammer & Co., Ltd.	7 6	43 10 0	33 0 0	29 0 0	—	4 10	5 3 0	10 10 0	0 10 8	0 12 0	†1 1 6
Harrod's, Ltd.	11 0	93 15 0	82 10 0	67 18 4	13 16 0	—	—	—	—	—	—
H. Keil	—	—	—	—	—	—	—	—	—	—	—
Lascelles & Co.	7 0	53 10 0	39 0 0	34 0 0	—	—	—	—	—	—	—
London School Furniture Co.	—	—	—	—	—	—	5 5 0	9 15 0	—	—	—
Lonnie & Co.	—	—	—	—	—	5 0	†4 13 0	†6 6 0	—	—	1 6 6
Marchant & Hirst	8 6	54 0 0	45 0 0	35 0 0	9 12 0	—	—	—	—	—	—
W. Martin	15 6	67 10 0	45 0 0	40 0 0	—	—	—	—	—	—	1 6 0
Mason & Sons	9 0	65 0 0	55 0 0	52 10 0	11 0 0	—	—	—	—	—	—
North of England School Furnishing Co.	12 2	57 4 6	47 13 6	37 4 6	9 17 6	—	—	—	—	—	—
Parkstone Steam Joinery Co.	11 6	50 0 0	36 0 0	31 0 0	8 14 0	—	—	—	0 14 0	—	—
Pearson & Brown	—	—	—	—	—	—	—	—	—	—	1 10 0 (Price does not include fixing.)
T. R. Roberts, Ltd.	—	—	—	—	—	—	—	—	—	—	—
Setten & Durward	—	—	—	—	—	—	—	—	—	—	—
Shoolbred & Co.	—	—	—	—	—	—	—	—	—	—	—
T. Smith	—	—	—	—	—	—	—	—	1 0 0	1 5 0	—
Spencer & Co.	10 6	68 17 6	53 16 6	47 10 0	12 7 0	—	—	—	—	—	—
T. E. Tuckett	—	—	—	—	—	—	—	—	—	—	1 11 10
Wallis & Co., Ltd.	7 9	43 15 0	34 11 8	31 5 0	†7 12 0	—	—	—	—	—	—
Waring & Sons, Ltd.	18 0	68 15 0	60 0 0	55 0 0	9 18 0	—	—	—	1 0 3	1 1 3	—
Wrinch & Sons	—	—	—	—	—	—	—	—	7 16 0 (complete)	—	—

LONDON.—For supply of ground-glass tablets (for the School Board for London) :—

	London School Furniture Co.	S. J. Waring & Sons.	G. M. Hammer & Co., Ltd.	T. Wallis & Co., Ltd.	E. Spencer & Co.	Galbraith Bros.	N.E. School Furnishing Co., Ltd.	General Builders, Ltd.	Educational Supply Association, Ltd.	H. Bouneau.	T. Cruwys.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Ground glass tablets, and fixing complete, exclusive of tapering blocks, per ft. run	4 9	11 6	6 0	10 9	8 7	5 6	9 9	8 9	8 0	6 6	4 3
Tapering blocks 3 ft. 3 in. by 2½ in. by 1½ in. fixing complete ..... each	0 4½	1 8	0 8	0 10½	1 0	1 6	2 8	2 6	..	0 6	0 6
Tapering blocks 3 ft. 3 in. by 3 in. by 1½ in. fixing complete ..... each	0 6	1 11	1 0	1 1½	1 1	1 6	3 0	3 0	..	0 8	0 7
Tapering blocks 3 ft. 3 in. by 4½ in. by 1½ in. fixing complete ..... each	0 8	2 3	1 1	1 4	1 2	1 8	3 4	3 3	..	0 9	0 9
Tapering blocks 3 ft. 3 in. by 6 in. by 1½ in. fixing complete ..... each	0 10	2 6	1 2	2 1½	1 4	2 0	3 8	3 6	..	0 11	0 10
Tapering blocks 3 ft. 3 in. by 9 in. by 1½ in. fixing complete ..... each	1 0	3 0	1 8	2 8	1 6	2 4	4 5	3 9	..	1 2	1 0
Tapering blocks 3 ft. 3 in. by 12 in. by 1½ in. fixing complete ..... each	1 3	3 7	2 0	3 5½	1 9	2 8	5 1	4 0	..	1 6	1 2

LONDON.—Running Contracts for the supply of furniture for teachers' rooms (for the School Board for London) :—

	Cushions. each.	Hearthrugs. each.	Hassocks. each.	Looking Glasses. each.	Folding Chairs. each.	Hammock Chairs. each.	Arm Chairs. each.	Wicker Chairs. each.	Table Covers, 70 in. wide. per yard.	Table Covers, 54 in. wide. per yard.	Turkey Red Twill for Window Curtains. per yard.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Shoolbred & Co.	†3 4	†10 9	1 1½	4 5	5 1	3 11	7 6	5 6	1 8½ 72 in. wide.	1 3½	0 7½ 34 in. wide.
Marshall & Snelgrove, Ltd.	3 4	11 1	1 0½	—	—	—	—	—	1 8½	1 4	0 8½ 35 in. wide.
Maple & Co., Ltd.	4 7	—	1 4½	3 1	4 11	3 10	6 3	4 9	2 11	2 3	0 6½
Atkinson & Co.	5 5	13 6	1 3	4 3	5 11	3 3½	6 10½	4 7½	†1 6½	†1 2½	0 6½ 35 in. wide.
Tarn & Co.	4 9	12 0	1 9	4 10	5 11	3 4	5 11	3 6	1 10½ 72 in. wide.	1 4½	†0 5½ 32 in. and 36 in. wide.
Harrod's, Ltd.	3 6	12 6	†1 0	4 6	5 0	3 11	†5 7	4 6	2 0½	1 5	0 8½
Oetzmann & Co.	3 7½	†4 3	1 9	†3 1	4 11	3 4½	7 3	3 9	1 8	1 3	0 8½
Lawes & Co.	—	—	—	—	6 7	3 7	7 0	4 6	—	—	—
T. Griffin	—	—	—	—	6 6	—	—	—	—	—	—
T. R. Roberts, Ltd.	4 4	14 8½	1 0½ and 2 1½	3 6	†4 9	†3 2	16 4	†3 6 and ‡3 9	1 7½	1 2½	0 7
Wallis & Co., Ltd.	3 8	11 8	2 8	3 4	5 9½	3 2	6 8 and ‡5 9½	3 6 and ‡3 9	1 8½	1 3½ 52 in. wide.	0 6½ 34½ in. wide.

‡ Not Board's samples.

PUBLISHER'S NOTICES.

THE INDEX (with TITLE-PAGE) for VOLUME LXXXIV. (January to June, 1903) was given as a supplement with the number for July 11.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings, price 9d. each.

THE EIGHTY-FOURTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence, is now ready.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 2s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c. &c.

Six lines, or under ..... 6s. 6d.
Each additional line ..... 1s. 0d.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for series of Trade advertisements, and for front page, and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only).

FOUR lines (about thirty words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES. { NINEPENCE EACH. By Post (carefully packed) 1s.

LONDON.—For repainting of the ironwork of the Blackwall Tunnel, for the L.C.C. :—
Proctor & Son ..... £590 | A. H. Inns* £420

LONDON.—For the supply of teak rails, sleepers, and plates for use in connexion with the construction of seats for use at the County Council's parks and open spaces :—

	Rails per set. s. d.	Sleepers per set. s. d.	Plates per set. s. d.
Williams & Son	20 0	4 6	1 6
Horton & Son	18 6	2 3	0 8
W. H. Jay	15 0	1 10	0 7
Marter & Co.*	12 9	1 6	0 8

LONDON.—For connexion of surface water outlet Graveney Brook, for the L.C.C. :—
Teill & Sons ..... £346 15 0 | A. C. Soan* £250 4 6
Kavanagh & Co. 276 14 0 |

[*See also next page.*

LONDON.—For the erection of a new junior school, for the Royal Masonic Institution for Girls at Clapham Junction. Mr. Henry A. Hunt, hon. architect and surveyor, 45, Parliament-street, Westminster, S.W. :—

Turtle & Appleton	£15,643	Patman & Fotheringham	£14,793
Longley & Co.	15,489	Godson & Son	14,767
Lawrence & Co.	15,283	Allen & Sons, Ltd.	14,750
Smith & Sons, Ltd.	15,203	Higgs & Hill*	14,664
Holloway Bros.	15,000		
E. F. Nightingale	14,999		

NOTTINGHAM.—For alterations and additions to house, Park-road, Nottingham. Messrs. A. R. Calvert and William R. Gleave, architects, Nottingham :—
G. A. Pillatt* £285
[Lowest of four tenders.]

NOTTINGHAM.—For additions to offices, Exchange-walk, Nottingham. Messrs. A. R. Calvert and William R. Gleave, architects, Nottingham :—
G. A. Pillatt* £375
[Lowest of four tenders.]

NOTTINGHAM.—For alterations to Savings Bank, Nottingham. Messrs. A. R. Calvert and William R. Gleave, architects, Nottingham :—
W. Woodsend* £1,432 17

NOTTINGHAM.—For erection of house and stables, Mapperley Plains. Messrs. A. R. Calvert & William R. Gleave, architects, Nottingham :—

Cooper & Son	£1,500	J. Musson	£1,466
F. Messom	1,560	Fish & Son	1,466
Maule & Co.	1,510	G. A. Pillatt	1,463
W. Appleby	1,467	T. Barlow*	1,424

[All of Nottingham.]

POYNINGS (Sussex).—For new roof, &c., to south transept of parish church. Mr. E. H. Lingen Barker, architect :—

W. Whiteman	£221 0 0	J. G. Pickard	£179 17 6
Saltin & Evershed	203 0 0	S. Hopkins	170 0 0
Longley & Co.	198 0 0	G. H. Eastwood	159 0 0
G. Gillam	180 0 0	G. S. C. Cattress, Poynings*	155 10 0

PUDSEY (Yorks.).—For the erection of a warehouse, &c., Priestley Mill. Mr. C. S. Nelson, architect, 15, Park-row, Leeds :—
Masonry, &c.—J. Tolly, Bradford....
Joinery.—Wilkinson & Sanderson, Pudsey.....
Plumbing.—J. Scartle, Pudsey .....
Slating.—F. Thornton, Stanningley ..
£1,037 1 5

SMALLBURGH (Norfolk).—For additions to workhouse, for the Guardians. Mr. J. T. Lee, architect, 26, Great James-street, London, W. Quantities by Mr. W. Thornicroft, 6, South-square, Grays Inn, W.C. :—

T. H. Blyth	£1,620 0 0	W. & F. Appleton	£1,489 8 9
Carter & Wright	1,619 0 0	H. Skuffham	1,479 4 1
G. Riches	1,572 0 0	G. E. Hawes	1,440 0 0
W. Porter	1,570 0 0	Boddy & Son	1,399 0 0
H. C. Greengrass	1,527 0 0	R. C. Watts	1,396 0 0
W. Laycock	1,498 10 0	W. J. Hannant	1,357 0 0
		Batchelor & Sons, Stalham	1,158 10 0

TIPPERARY.—For the erection of two curates' residences. Messrs. W. H. Hill & Son, architects, 28, South Mall, Cork :—
Dennis Duggon, Cork* £1,609

WYMONDLEY (Herts.). — For alterations and additions to Wymondley House, for Mr. James W. Courtenay. Mr. W. Taprell Allen, architect, Hitchin and Stevenage. Quantities by Mr. Vincent Cattermole Brown, Paignton :—

J. Spratt	£4,358	Seymour & Sons	£3,955
Coulson & Lofts	4,200	Willmott & Sons, Hitchin*	3,489
Redhouse & Sons	4,049		

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect :—

CULLODEN-STREET.—Painting interior and exterior :—

Parrott & Isom	£721 0	Gibb & Co.*	£459 0
Vigor & Co.	540 0	J. F. Holliday	438 10
Turnbull & Sons	498 0		

MORDEN-TERRACE.—Painting interior and exterior of housewifery centre, and exterior of main school buildings :—

M. E. Allen	£280 17 6	Proctor & Son	£232 0 0
W. J. Howie	270 0 0	H. Groves	219 0 0
E. B. Tucker	268 11 0	G. Kemp	186 0 0
W. Banks*	244 19 6		

CORRECTION.—In reference to the list of tenders in our last issue for Townmead Schools, Fulham, we stated that the amount of the tender of Messrs. G. E. Wallis & Sons, of Maidstone, was £14,148, whereas it should have been £24,148.

B. NOWELL & CO.
STONE MERCHANTS & CONTRACTORS.
Chief Office,—*Warwick Road, KENSINGTON.*
Norway, Guernsey, and Leicestershire Granite, Kerb, Pitching, and Yorkshire Stone.
ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

J. J. ETRIDGE, Jr.
SLATE MERCHANT,
SLATER and TILER.
Penrhyn - Bangor,
Oakeley - Portmadoc,
and every other description of Slates, except American, Ready for immediate delivery to any Railway Station.
RED SANDFACED NIBBED ROOFING TILES ALWAYS IN STOCK
Applications for Prices, &c., to
BETHNAL GREEN SLATE WORKS,
BETHNAL GREEN, LONDON, E.

Architects, Engineers, & Builders
will find that
THE BEST SELECTION,
THE BEST QUALITY, and
THE BEST VALUE in
Drawing Requisites
are to be obtained at
The Architects and Engineers' Supply Association,
74-76, GREAT QUEEN STREET, LONDON, W.C
Catalogue and Sample Books on application.

THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(Incorporating the Ham Hill Stone Co. and C. Trask & Son, The Doulting Stone Co.).
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

SPRAGUE & CO.'S, Ltd.,
"INK-PHOTO" PROCESS,
4 & 5, East Harding-street,
Fetter Lane, E.C.

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch. [Telephone No. 60 Westminster.
METCHIM & SON { 8, PRINCES STREET, E.W. and 20, CLEMENT'S LANE, E.C.
"QUANTITY SURVEYORS' DIARY AND TABLES."
For 1903, price 6d. post 7d. In leather 1/- Post 1/1.

JOINERY
Of every description and in any kind of Wood.
CHAS. E. ORFEUR,
ESTIMATES ON APPLICATION.
COLNE BANK WORKS, COLCHESTER.
Telephone: 0196. Telegrams: "Orfeur, Colchester."

ASPHALTE
For Horizontal & Vertical Damp Courses.
For Flat Roofs, Basements, & other Floors.
Special attention is given to the above by
THE
French Asphalte Co.
Contractors to
H.M. Office of Works, The School Board for London, &c.
For estimates, quotations, and all information, apply at the Offices of the Company,
5, LAURENCE POUNTNEY HILL,
CANNON STREET, E.C.

TWELVE GOLD AND SILVER MEDALS AWARDED.
IRON CISTERNS.
F. BRABY & CO.
VERY PROMPT SUPPLY.
LARGE STOCK READY.
Particulars on application.
CYLINDERS FOR HOT-WATER CIRCULATION.
LONDON: 352 to 364, EUSTON-ROAD, N.W., and 218 and 220, HIGH-STREET, BOROUGH, S.E.
LIVERPOOL: 6 and 8, HATTON GARDEN.
GLASGOW: 47 and 49, ST. ENOCH-SQUARE.
BRISTOL: ASHTON GATE WORKS, CORONATION-RD.